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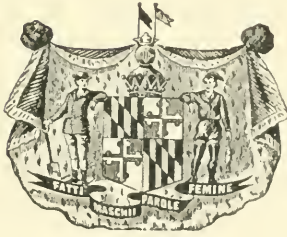
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MARYLAND GEOLOGICAL SURVEY

EDWARD BENNETT MATHEWS, State Geologist

THE GEOGRAPHY OF MARYLAND



BY
WM. BULLOCK CLARK

(Special Publication, Volume X, Part I)

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PART I

THE GEOGRAPHY OF MARYLAND

BY
WM. BULLOCK CLARK

THE GEOGRAPHY OF MARYLAND

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INTRODUCTION

LOCATION.—The State of Maryland, lying midway between the North and the South, and stretching from the Atlantic Ocean to the crest of the Alleghanies, with the great estuary of Chesapeake Bay and its tributaries extending far into the land in all directions, possesses many natural advantages in its location. There is probably no state of equal size in the Union that has such a variety in its agricultural and mineral resources and in its sea and bay products, while its generally salubrious climate renders every section healthful as a place of residence. From its eastern to its western borders may be found a succession of districts suitable from their surroundings for the most diverse employments.

The State of Maryland is the most northern of the Southern States, and is situated between the parallels $37^{\circ} 53'$ and $39^{\circ} 44'$ north latitude and the meridians $75^{\circ} 4'$ and $79^{\circ} 30'$ west longitude.

BOUNDARIES.—The boundaries of Maryland are based upon both arbitrary locations and geographic features. Different interpretations of the descriptions of the limits of the early grants, such as “the land hitherto unsettled,” and “the first fountain of the Potomac,” led to prolonged disputes, some of which have only been settled in recent years. The northern, as well as parts of the eastern, southern, and western boundaries are conventional lines of which the best known is the “Mason and Dixon Line.”

The *eastern* and *northern* boundaries of Maryland consist of the Atlantic Ocean and a line separating the former possessions of the Penns,

NOTE.—Compiled largely from published data brought together by the author and his associates for the Maryland Geological Survey.

now the states of Pennsylvania and Delaware, from those of the Lords Baltimore. From the original settlements of the country these lines were in dispute. The original grants to Lord Baltimore in 1632, which included the country to 40° north latitude, embraced territory (now part of Pennsylvania) which was subsequently granted in 1680 to William Penn and a smaller area (now Delaware) settled by the Swedes and Dutch, and later granted to the Duke of York and by him trans-



FIG. 1.—VIEW OF THE STATE HOUSE AT ANNAPOLIS.

ferred to Penn in 1682. By a decision of the English courts in 1760 interpreting an earlier agreement greatly to the disadvantage of Lord Baltimore, the boundary line was to run due west from "Cape Henlopen" (Fenwicks Island, 15 miles south of the point now known as Cape Henlopen) to a point midway between the Chesapeake and the Atlantic. From this "middle point" the line was to run northerly, tangent to a circle of 12 miles radius whose center was at Newcastle, Delaware. From the "tangent point," where the tangent line touched the circle, the boundary was to follow the circle to a point due north of the tangent point. From

this point the line was to run due north to the northeast corner, which was to be on the parallel of latitude, 15 miles south of the southernmost part of Philadelphia, as it was at the time of the legal decision in 1760. From this northeast corner the boundary was to extend due west to the western limits.



FIG. 2.—VIEW OF CITY HALL, BALTIMORE.

Attempts had been made by local surveyors to run the lines during the decade preceding the assignment of the work in 1763 to Charles Mason and Jeremiah Dixon, noted English astronomers and mathematicians, but the difficulties of running such peculiar lines through unbroken forests had been too great for the colonial surveyors with their crude instruments. When Messrs. Mason and Dixon arrived in Philadelphia,

in 1763, they found that the local surveyors had already determined the "middle point" and the "tangent point," and had run a provisional line as far as the northeast corner. From the time of their arrival in November, 1763, until December, 1767, Mason and Dixon were engaged in redetermining the earlier work and in running and marking the northern boundary which they continued to Dunkard's Creek, some miles beyond the limits of Maryland, where they were stopped by the Indians. Along the greater portion of the lines surveyed by them, each mile was marked by a stone monument (mounds of stone surrounding wooden posts were used west of Sideling Hill) which had on four out of five mile-stones the letter "P" engraved on the northern side, and the letter "M" on the southern side; while at each fifth mile was a stone of the same size, known as a "crown-stone," with the coat-of-arms of the Penns cut on the northern face and with that of Lord Baltimore on the southern. These stones came from the quarries on the Isle of Portland in England. Some of the original monuments remained in good condition, but many had become dilapidated or had been removed in the more than 100 years since the earlier survey, when the legislatures of Maryland and Pennsylvania made provision in 1900 for the relocating and remarking of the line, and this work was completed in 1904. This line, known as the Mason and Dixon Line, became famous in the great controversy preceding the Civil War, as the boundary between the free and slave-holding states, and has been regarded as the division line between the North and the South.

The *southern* boundary, likewise in dispute since Colonial days, was permanently settled in 1874, as far as the Maryland-Virginia portion was concerned, by a board of commissioners appointed by the states of Maryland and Virginia. According to this agreement the boundary follows the low-water line on the right bank of the Potomac River to Smith's Point at its mouth, thence northeasterly across Chesapeake Bay to the southern end of Smith's Island, and thence to the middle of Tangier Sound. Here the boundary runs south 10° 30' west, until it intersects a straight line connecting Smith's Point and Watkins Point, and thence eastward through the center of Pocomoke Sound and Pocomoke River

until it reaches the westward prolongation of the old Scarborough and Calvert line surveyed in 1668, which it follows to the Atlantic Ocean.

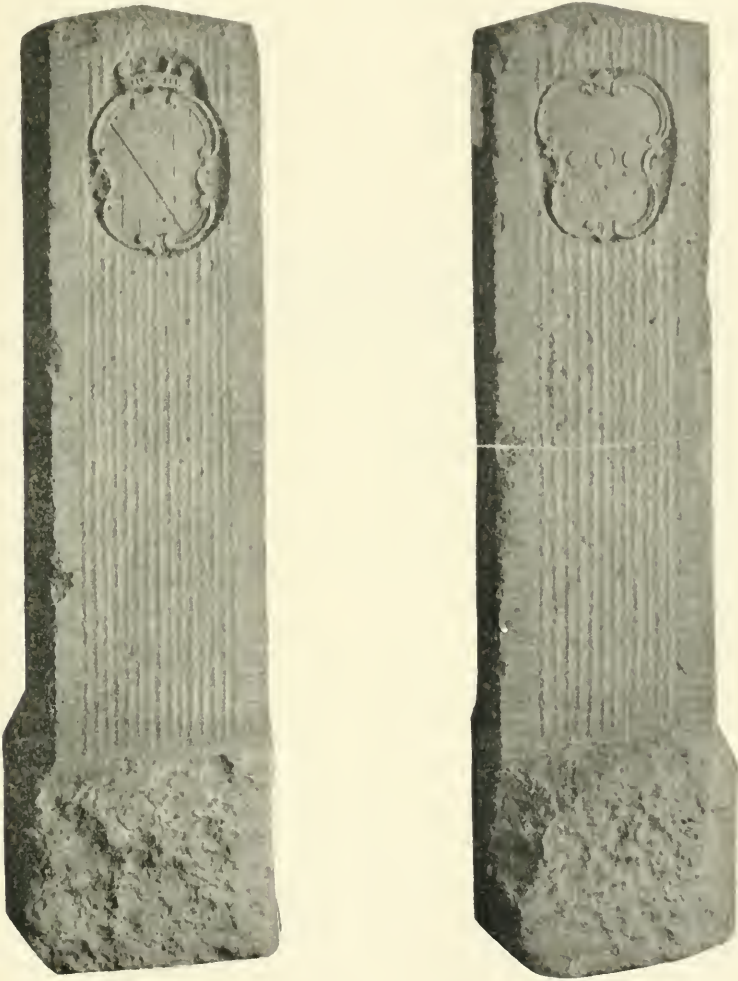


FIG. 3.—VIEW OF MASON AND DIXON LINE MONUMENT STONES.

There is still some controversy as to the exact location of some of the boundary marks, especially in Pocomoke Sound, where the oyster interests

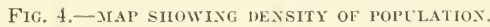
of Maryland and Virginia conflict. The Maryland-West Virginia portion of the boundary also follows the right bank of the Potomac River and its north branch.

The *western* boundary of the state, according to the original charter, was to run due north from the "first fountain" of the Potomac River. The North Branch was early regarded as the main stream, but later surveys have shown the South Branch to be longer than the North Branch. The "Fairfax Stone," planted on October 17, 1746, and supposed to have been placed at the westernmost source of the North Branch, has been shown in later years to be on a tributary of that stream, the real source being about one mile farther west, which was marked by the State of Maryland in 1897 with a monument known as the "Potomac Stone." A very crooked line was run by Deakins in 1787 from the Fairfax Stone to the northern boundary line. Subsequently in 1859 a straight line was run by Lieutenant Michler, of the U. S. Army, from the same point. In 1897 the State of Maryland ran a straight line from the Potomac Stone. The questions at issue were decided on May 27, 1912, by the Supreme Court of the United States in favor of the Deakins line of 1787, which thus becomes the legal western boundary of the state, separating it from West Virginia.

SIZE.—The extreme width of the state from east to west is 240 miles, and the extreme length from north to south 125 miles, the latter, however, narrowing toward the west where it becomes scarcely more than $1\frac{1}{2}$ miles at Hancock. Beyond this point it again broadens, although narrowing again at Cumberland to 5 miles. The total area within the limits of the state is estimated at 12,327 square miles, of which 9941 square miles are land. The remaining 2386 square miles are water, distributed as follows: Chesapeake Bay proper, 1203; estuaries of the Bay, 1023; Chincoteague Bay, 93.

Maryland ranks forty-first among the states in area. It is about one-fourth the size of Pennsylvania, which borders it upon the north; one-half the size of West Virginia, its western neighbor; somewhat less than one-third the size of Virginia, which lies to the south; and about six times the

POSITION.—A comparison of the position of Baltimore, the largest city of the state, with some of the more prominent cities of this country and of the world, shows that several are very nearly on the same latitude, the following being within 1 degree or less: Columbus, Cincinnati, Indianapolis, Springfield, St. Louis, Topeka, Denver, San Francisco, Lisbon, Palermo, Athens, Peking, Constantinople, and Tokyo. In longitude it



POPULATION.—Maryland has a population of 1,295,346, according to the census of 1910, which gives it the rank of twenty-seventh among the states. Of this population 1,062,639 are whites and 232,250 are colored. The average colored population for the state is 17.9 per cent. In 12 of the counties it is in excess of 25 per cent, the maximum being reached in Charles County which has 52.3 per cent.

Native whites of native parentage comprise 59.2 per cent of the entire population; native whites of foreign or mixed parentage 14.8 per cent;

and foreign-born whites 8 per cent of the total population. The foreign-born white population came chiefly from Germany, Russia, and Ireland. The number of males 21 years of age and over are 367,908, of which 82.5 per cent are white and 17.4 per cent colored. Males of military age, 18 to 44, number 272,373. The number of persons above 10 years of age who are unable to read and write is 73,397, or 7.2 per cent of the population above this age, of which 23.4 per cent are among the colored and 11.9 per cent among foreign-born whites, and 2.6 per cent among native whites.

The total number of dwellings in Maryland is 253,805, with a total number of families of 274,824. The average number of persons per dwelling is 5.1, and the average persons per family 4.7.

TOTAL POPULATION OF THE STATE AT VARIOUS PERIODS

Census year	Population	Increase over preceding census		Per cent of increase for the U. S.
		Number	Per cent	
1634	200	.....	....	....
1660	12,000	.....	....	....
1671	20,000	.....	....	....
1701	25,000	.....	....	....
1715	30,000	.....	....	....
1748	130,000	.....	....	....
1756	154,188	.....	....	....
1760	166,523	.....	....	....
1770	199,827	.....	....	....
1775	225,000	.....	....	....
1782	254,050	.....	....	....
1790	319,728	.....	....	....
1800	341,548	21,820	6.8	35.1
1810	380,546	38,998	11.4	36.4
1820	407,350	26,804	7.0	33.1
1830	447,040	39,690	9.7	33.5
1840	470,019	22,979	5.1	32.7
1850	583,034	113,015	24.0	35.9
1860	687,049	104,015	17.8	35.6
1870	780,894	93,845	13.7	22.6
1880	934,943	154,049	19.7	30.1
1890	1,042,390	107,447	11.5	25.5
1900	1,888,044	145,654	14.0	20.7
1910	1,295,346	107,302	9.0	21.0

COUNTIES.—Maryland is divided into 23 counties and Baltimore City, of which Garrett, Allegany, Washington and the western part of Frederick comprise the mountainous region known as Western Maryland; the eastern part of Frederick, Carroll, Montgomery, Howard, Baltimore, Harford and the northern part of Cecil the Piedmont area, which is also referred to under the name of Northern-Central Maryland; Anne Arundel, Prince George's, Calvert, Charles, and St. Mary's, commonly called Southern Maryland; and the southern part of Cecil, Kent, Queen Anne's, Talbot, Caroline, Dorchester, Wicomico, Somerset, and Worcester, known as Eastern Maryland. Of these 23 counties all but seven lie upon navigable waters.

There seems to have been no consistent method adopted in erecting the several counties of the state. Some, like St. Mary's and Kent, grew with the development of the province and were subsequently bounded by the erection of new counties; others, like Charles and Dorchester, were erected by the ruling of Lord Baltimore. Cecil County was erected by proclamation of the Governor; while Washington, Montgomery, Howard and Wicomico were established in constitutional conventions. The great majority of counties were, however, erected by Acts of Assembly. The records now extant do not show the original extent or the exact date of erection of several of the counties, but it is of interest to note that 18 out of the 23 counties were established before the close of the Revolutionary War, and 11 of these before 1700. Baltimore City, since 1851, has not been in any county, but unlike any other American city, except Greater New York, is a distinct division of the state.

The counties of Maryland, unlike those of many other states, are the ultimate units of territory and not the combination of townships. This fact, together with the paucity of large towns and the agricultural character of the communities, have made the counties as such of unusual importance in all political and social relations. Election districts are established in all the counties.

COUNTIES ARRANGED IN THE ORDER OF THE DATE OF
THEIR ERECTION

Counties	Origin of name	Date of formation
St. Mary's	In honor of the Virgin Mary, the landing having been made on the Feast of the Annunciation.....	1637
Kent	After the English county.....	1642
Anne Arundel	After Lady Anne Arundel, wife of Cecil, second Lord Baltimore	1650
Calvert	After the family name of the Proprietary.....	1650
Charles	After Charles, Lord Baltimore.....	1658
Baltimore	From the Proprietary's Irish Barony (Celtic biltemor; <i>i. e.</i> , the large town).....	1659
Talbot	After Grace Talbot, daughter of George, first Lord Baltimore	1662
Somerset	After Mary Somerset, sister of Lord Baltimore.....	1666
Dorchester	After Earl Dorset, a family friend of the Calverts....	1668
Cecil	After the Christian name of the second Lord Baltimore	1674
Prince George's	After Prince George of Denmark.....	1695
Queen Anne's	After Queen Anne of England.....	1706
Worcester	After the Earl of Worcester.....	1742
Frederick	After Frederick, heir apparent.....	1748
Caroline	After Lady Calvert, sister of the last Lord Baltimore	1773
Harford	After Sir Henry Harford, last Proprietary.....	1773
Washington	After General Washington	1776
Montgomery	After General Montgomery	1776
Allegany	After Oolikhanna; <i>i. e.</i> , beautiful stream.....	1789
Carroll	After Charles Carroll of Carrollton.....	1836
Howard	After John Eager Howard, the elder.....	1851
Wicomico	After the river of that name, from wicko, house, and mekee, building; <i>i. e.</i> , referring to an Indian town on the banks	1867
Garrett	After John W. Garrett.....	1872

HISTORY.—Chesapeake Bay was probably known to some extent to the Spaniards by the early part of the Sixteenth Century, long before the English attempted to establish themselves in any part of the American continent. The first account of the physical characteristics of the Maryland area was given, however, by Captain John Smith, of the Virginia colony, who, in an open boat with a few companions, began an exploration of the upper portions of Chesapeake Bay and its numerous tributaries



FIG. 5.—VIEW OF WYE HOUSE, A COLONIAL MANSION IN TALBOT COUNTY.



FIG. 6.—VIEW OF HOMEWOOD, BUILT BY CHARLES CARROLL OF CARROLLTON IN 1804.
ON GROUNDS OF THE JOHNS HOPKINS UNIVERSITY.

in the year 1608. During the two trips which he made in the summer of that year, the shores of the Bay were surveyed as far as the Susquehanna River, the harbor of Baltimore was entered, and the Potomac River was ascended as far as the falls above Georgetown. The map which Captain Smith prepared as a result of his trips shows with remarkable correctness the outlines of the regions which he visited.

The charter of Maryland was granted by Charles I to George Calvert, first Lord Baltimore, but as he had died before the patent passed the Great Seal, as the result of delays caused by the objections of the Virginia Company, it was issued to his son Cecilius Calvert, second Lord Baltimore, on June 20, 1632.

The name of Maryland was given to the colony in honor of Queen Henrietta Maria, the wife of Charles I. Under the terms of the charter the territory to the north of Virginia to 40° north latitude was included in the grant to Lord Baltimore, who was made the owner of the land, Maryland thus becoming the first proprietary colony. Many liberties were allowed, including freedom from taxation, by the King, and practically royal power was conferred on the Proprietor.

The first permanent settlement was made on March 27, 1634, at St. Mary's by a party under the leadership of Leonard Calvert, brother of Lord Baltimore, who arrived with his associates on the *Ark and Dove*. They maintained from the start friendly relations with the Indians but found in William Claiborne, who had established a trading post on Kent Island on the Chesapeake in 1631 and who had opposed the granting of the Maryland charter, a bitter enemy who defied the authority of the Proprietary by force of arms. Although this settlement was brought under subjection, Claiborne continued an enemy of the colony and later fomented trouble again, even depriving the Governor of his office for a time.

One of the chief objects of Calvert in establishing the colony was to provide an asylum for persecuted Catholics, although he was equally desirous of having Protestant colonists. From the first, religious toleration was the recognized custom of the colony, and was definitely established by the Colonial Assembly in 1649 by the passage of the famous

“Act of Toleration,” which granted religious liberty to all sects of trinitarian Christians.

Lord Baltimore reserved to himself the right to initiate legislation until 1638, when this was conceded to the people, the Proprietary still holding the veto power. About 1650 a company of Puritans from Virginia sought refuge in Maryland and made a settlement on the present site of Annapolis, then called Providence, and were permitted, in order to conciliate them, to be organized as Anne Arundel County. The success of the Puritans in England under Cromwell accentuated the conflict between the Proprietary and the Puritan party in Maryland, which became so serious that a Parliamentary commission in 1654 permanently deposed the officers of the former and appointed a Puritan Council, thus depriving the Lord Proprietary of his government. In 1658 the power of the Proprietary was again restored, to be soon disturbed, however, by the attempt of the Proprietary Governor to establish a commonwealth. With the coming of the English Restoration in 1660 order was finally established.

Again in 1688, because of the delay of Lord Baltimore's deputies in proclaiming the sovereignty of William and Mary, owing to the death of a messenger sent to the colony, a company of Protestants under the leadership of John Goode seized St. Mary's and assumed control of the government, and in 1692 Maryland was proclaimed a royal colony. Lord Baltimore was deprived of his political power and privileges, although his property rights were not affected. In 1694 the capital was moved from St. Mary's City to Annapolis. Maryland remained as a royal colony until the death of the third Lord Baltimore in 1715 when the fourth Lord Baltimore, who was a Protestant, was recognized as Proprietor. From this date the Proprietary continued until after the death of the sixth and last Lord Baltimore in 1771, when the opening of the Revolution, a few years later, put an end to it, Sir Henry Harford being Proprietor during this short interval.

Maryland's part in the French and Indian War was not conspicuous, but Braddock and Washington fitted out their expedition against Fort Duquesne (Pittsburgh) at Frederick. Fort Frederick, situated 40 miles farther west, was built in 1756, and both at this period and later served to protect the colony from the west.

The burning of the *Peggy Stewart* with a cargo of tea in the harbor of Annapolis on October 19, 1775, has ever since been celebrated by Marylanders as Peggy Stewart Day. No military operations took place in Maryland during the Revolutionary War, although the "Maryland Line"



FIG. 7.—VIEW OF THE HISTORIC WYE OAK, WYE MILLS, TALBOT COUNTY.

fought with valor in many engagements, especially those of Long Island, Camden, Cowpens, Guilford, and Eutaw Springs. In the first of these battles the Maryland troops covered the retreat of General Washington's army, and a monument to their valor has been erected in Prospect Park,

Brooklyn, on which is inscribed, "In honor of Maryland's four hundred who on this Battlefield, August 27, 1776, saved the American Army." In 1776 General Washington was invested by the Continental Congress, then in session in Baltimore, with dictatorial powers as Commander-in-Chief of the Continental Army. On December 22, 1783, Washington resigned his commission as commander-in-chief of the army in the Senate chamber at Annapolis, where the Continental Congress was then in session. Maryland ratified the Constitution of the United States on April 28, 1788, being the last of the 13 colonies to come into the Union. She had refused to accept the articles of confederation until those colonies which had claims to western lands had surrendered them to the



FIG. 8.—FORT FREDERICK, WASHINGTON COUNTY, BUILT IN 1756. WHERE WASHINGTON FITTED OUT HIS EXPEDITION AGAINST FORT DUQUESNE IN THE FRENCH AND INDIAN WAR.

general government. In 1790 Maryland ceded to the federal government 60 square miles of territory for the National Capital, which became the District of Columbia in which Washington is situated. Fort McHenry, the construction of which had been started by patriotic citizens for the defence of Baltimore, was already partly completed in 1794 when it passed to the federal government. It was finally completed in 1805.

During the War of 1812 several Maryland towns were pillaged by the British, but Baltimore was saved from plunder by the repulse of the enemy at North Point and Fort McHenry. It was during the bombardment of the latter place that Francis Scott Key, who was held aboard a British vessel in the harbor of Baltimore, wrote "The Star-Spangled Banner."

Maryland was a slave-holding state at the outbreak of the Civil War, and sentiment was divided between the North and the South, but the

decisive measures adopted by the national government made it impossible for the state to secede. Three of the battles of the Civil War were fought on Maryland soil, South Mountain (September 14, 1862), Sharpsburg, or Antietam (September 16-17, 1862), and Monocacy (July 9, 1864). There were also small conflicts at many points, especially along the Potomac.

In the history of the state are many incidents which have since become of national or international importance. The first wheat was shipped to Europe from Baltimore in 1771; the first regular steam packet that crossed the Atlantic direct from the United States sailed from Baltimore in May, 1838; the Morse telegraph line transmitted its first message ("What hath God wrought?") from Baltimore to Washington, April 9, 1844; while in the same city was manufactured the first armor plate for the Monitor in 1862. Baltimore was the first city in America to have a water company (1792), street gaslights (1816), a railroad (1828), an iron building (1851), an electric street railroad (1885), an electric locomotive (1895). The city contains the first official state monument to George Washington (1815), the oldest American lodge of the Independent Order of Odd Fellows (1819), and the oldest College of Dental Surgery (1839).

The earliest settlers in Maryland were Englishmen, whose descendants are now scattered all over the state, and comprise the leading element in the population. Many of the early settlers in the country adjacent to Pennsylvania were of German extraction, and their descendants are to-day numerous and influential. Next in importance are the negroes, who comprise nearly one-fifth of the population and who are relatively more prominent in Charles, Calvert, and St. Mary's counties, where they compose about one-half of the population, and least important in the western counties along the Mason and Dixon Line, where there is only one negro, on the average, to 14 whites. In Baltimore, Cecil, and Harford counties, the negroes comprise one-sixth of the population, while in the counties of the eastern and western shores, not previously enumerated, they form about two-fifths of the entire population. During the last 25 years there has been a great increase in the Polish, Hungarian, and Bohemian inhabitants, who have settled chiefly in Baltimore City.

Maryland has always been a religious center. As early as 1631 services were regularly conducted on Kent Island by an ordained minister of the Church of England. The first Presbyterian church in America was established at Snow Hill about 1700, and in 1766 Robert Strawbridge established the first Methodist congregation in America in Carroll, then Frederick, County. Many of the most prominent of the early settlers were Roman Catholics, and the See of Baltimore has held the first position in America since the decree of 1858. There are 59 denominations or sects represented in Maryland, and although many of them are scattered throughout the state they show local variations in strength, which are often closely related to the history, beliefs, and nationalities of the early settlers.

STATE GOVERNMENT.—The present government of the State of Maryland is based on a constitution formulated and ratified in 1867. Earlier constitutions were adopted in 1776, 1851, 1864, and the constitution of 1776 was very much changed in 1837. According to the present constitution the state is divided into 23 counties and Baltimore City, which in turn are subdivided into districts for school and election purposes. There are no units such as townships, but the local affairs of the cities, towns, and villages are carried on by officers in accordance with charters and special acts.

Among the state officials are the Governor, elected for four years, and the Secretary of State, who is appointed by the Governor. The Senate and House of Delegates, which together form the General Assembly or Legislature, consist of 27 Senators, elected for four years, one from each of the 23 counties and the four districts of Baltimore City, and 101 Delegates, elected for two years. Each of the legislative districts of Baltimore is entitled to six Delegates, the number allowed the largest county. The Assembly meets every other year on the first Wednesday in January, and may remain in session only 90 days. At the call of the Governor a special session may be held, which is limited by law to 30 days.

The judicial powers of the state are vested in a Court of Appeals composed of eight judges; a Circuit Court with eight chief judges (one for

each judicial district), seven of whom are judges of the Court of Appeals,¹ the chief judge of Baltimore City not being a member of that court, and 22 associate judges, eight of the latter with the chief judge above-mentioned constituting the Supreme Bench of Baltimore City, the other judicial districts having two associate judges each; and an Orphans' Court with 72 judges. The Appeal and Circuit Court judges are elected for 15 years, the judges of the Orphans' Court for four, the registrars of wills for six, and the sheriffs for two. The Attorney-General of the state and the State's Attorneys are elected for four years. Justices of the peace, constables, coroners, and notaries are appointed by the Governor.

Among other prominent state officials are the Comptroller, who is the financier for the state, and who is elected by the people for two years; and the Treasurer, who is the banker and who is elected by the General Assembly for a two-year term.

The more important state organizations are the Board of Public Works, consisting of the Governor, Comptroller, and Treasurer; Maryland National Guard, State Conservation Commission, Land Office, State Board of Agriculture, State Geological Survey, State Roads Commission, State Board of Forestry, Bureau of Industrial Statistics, Immigration Bureau, Board of Education, Board of Health, Board of State Aid to Charities, Penal Commission, and State Lunacy Commission.

EDUCATION.—The educational history of the state dates back to 1696, when Governor Francis Nicholson established the first public school at Annapolis, now St. John's College. The state schools were brought under the general supervision of the State Board of Education in 1864, and are now supported by state and local taxation. A State Superintendent of Schools was provided for by the General Assembly of 1900. The number of public schools in Maryland in 1914 was 2485, of which 1935 were for the whites (Baltimore 95), and 550 for the colored (Baltimore 16). The number of public school teachers was 5996, of which 5056 were white (Baltimore 1589), and 940 colored (Baltimore 268). The number of public school pupils was 245,258, of which 200,783 were whites (Baltimore

¹ The eighth judge from Baltimore City does not serve in the Circuit Court.

76,539), and 44,475 colored (Baltimore 12,088). The total value of public school property in 1915 was \$11,110,587 (Baltimore \$6,065,717), and the amount expended for public school purposes for the year ending July 31, 1915, was \$5,904,859.81 (Baltimore \$2,585,312.95). The state school system also includes normal schools for teachers, schools for the deaf and dumb, and for the blind.

Baltimore is the educational center of the state. In this city are located the Johns Hopkins University (established in 1876, Medical School in 1892, Engineering Department, 1912); Maryland University (Medical College, 1807, Law School 1869, Dental School 1882, School of Pharmacy 1904, St. John's College added 1907); Goucher College (1888); Loyola College (Roman Catholic 1852); the Peabody Institute (1866); the Maryland Institute (1826); and several other institutions.

Within the limits of the state are also the State College of Agriculture at College Park (1859); St. John's College at Annapolis (1789); Washington College at Chestertown (1782); Mt. St. Mary's College at Emmitsburg (Roman Catholic, 1808); Western Maryland College at Westminster (Methodist Protestant, 1867); Rock Hill College near Ellicott City (1857); and many smaller institutions.

CHARITIES AND CORRECTIONS.—Maryland has several hundred charitable institutions which care for the poor and unfortunate of the state. Many of these are nonsectarian, but the great majority are supported by the various religious organizations. There has been established recently an Alliance of Charitable and Social Agencies of Baltimore that embraces the leading general organizations of this character, including the Federated Charities, Henry Watson Children's Aid Society, Babies' Milk Fund Association, Friendly Inn Association, Prisoner's Aid Society, Instructive Visiting Nurse Association, Maryland Association for the Prevention and Relief of Tuberculosis, Social Service Corporation, Mothers' Relief Society, Travellers' Aid Society, Mental Hygiene Society, and the Maryland Children's Aid Society.

There are several large hospitals in Baltimore, including the Johns Hopkins Hospital, the Maryland University Hospital, Mercy Hospital,

Maryland General Hospital, etc., while there are local hospitals at Cumberland, Hagerstown, Cambridge, Easton, and other towns. There are also several hospitals for the insane maintained both by the state and by privately endowed boards, among the more important being the State Hospital at Springfield, maintained under state auspices, and the Shepard and Enoch Pratt Hospital, maintained by private endowment. There is also an asylum and training school for the feeble-minded at Owings Mills and a State Sanitarium at Sabillasville.

The state has various correctional institutions, including the State Penitentiary at Baltimore and the House of Correction at Jessups. There are also reform schools for the incorrigible youth of the state.

HIGHWAYS, CANALS, AND RAILROADS.—During the early years of the province transportation was entirely by water, and compensation for boat hire instead of mileage was allowed to the members of the Assembly from Kent and Anne Arundel counties. At first the construction and repair of roads was a matter of private concern, and over a quarter of a century elapsed between the settlement at St. Mary's and the passage of the first road law of the colony in 1666, under which overseers were appointed by the county courts. Even at this time the "highwaies" were little more than trails through the forests and transportation by wagons was as yet unknown. A great advance upon the earlier methods was made by the establishment in 1695 of a regular post route, largely by land, from the Potomac River to Philadelphia via Annapolis and the Eastern Shore. Further road legislation was enacted in 1696 and in 1704, under the latter act provision being made for public roads 20 feet in width. This act remained the law of the province for 50 years, and it was during this period that the so-called "notch roads" were built. One of these, the Three-Notch road of Southern Maryland, shows even to-day the notches cut in the oaks along its route. During this period also were built many of the so-called "rolling roads" for the rolling of tobacco in hogsheads to tide. The name still persists in the Rolling Road of Baltimore County. In 1765 a stage line was established between Baltimore and Philadelphia, and soon thereafter ferries and stage lines extended southward into



FIG. 9.—ENTRANCE TO THE CHESAPEAKE AND DELAWARE CANAL AT CHESAPEAKE CITY, CECIL COUNTY.



FIG. 10.—TOLL HOUSE ON NATIONAL ROAD, BUILT AFTER THE STATE TOOK CONTROL OF THE ROAD IN 1834.

Virginia. With the western movement during the eighteenth century the construction of roads to the west began. Among these were the "Monocacy Road" and "Braddock's Road," the latter being the first road built across the mountains. The construction of "turnpikes" in Maryland by incorporated companies, which furnished the first improved roads in the state, dates from the passage of an Act of Assembly of 1804-5, under which the Frederick, Reisterstown, York and Falls Turnpike companies were soon incorporated. A few years later the Cumberland road was constructed to connect at Cumberland with the National Road built at the expense of the federal government from Cumberland to the west, and thrown open to the



FIG. 11.—A MODERN HIGHWAY NEAR PRINCESS ANNE, SOMERSET COUNTY.

public in 1818. From that time until the coming of the railroad in 1852 the "National Road" was "the one great highway over which passed the bulk of trade and travel and the mails between the East and West."

Maryland has constructed during the past decade one of the finest systems of improved highways to be found anywhere in the country. This work began with the passage in 1898 of a State Highway Law providing for a Highway Division in connection with the Maryland Geological Survey, under which the foundation for the later work was laid. In 1904 a State Aid Highway Act appropriating \$200,000 annually to be met by an equal amount from the counties was passed; and in 1906 an act appropriating money for the construction of the Baltimore-Washington Boule-

ward was also enacted, the administration of both of these acts being also placed under the Maryland Geological Survey. In 1908 a State Road Commission was established for the construction of a main-artery system entirely at state expense, and \$5,000,000 were appropriated for the work. In 1910 all of the highway work was placed under the State Roads Commission. Nearly 1500 miles of modern highways, out of a total state mileage of 14,483 miles, have been constructed up to the present, at a cost of about \$15,000,000 under these several acts. This modern system of highways radiates from Baltimore to all portions of the state and connects all of the leading centers of population.

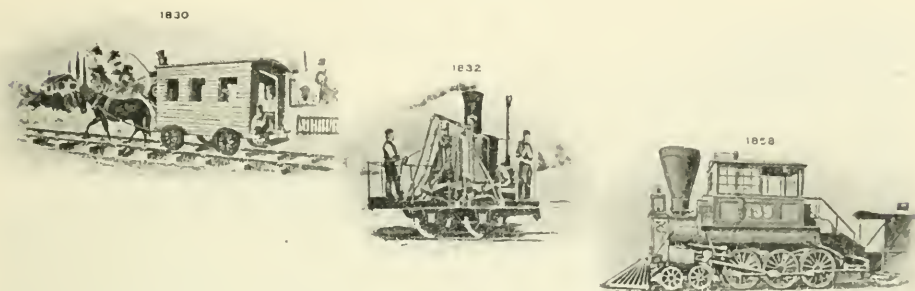


FIG. 12.—THE BALTIMORE AND OHIO RAILROAD IN 1830, 1832, AND 1858.

Many canal projects were proposed during the latter part of the eighteenth and early part of the nineteenth centuries, and several canals were built of which only two are to-day in operation—the Chesapeake and Delaware Canal connecting the Chesapeake and Delaware bays, started in 1824 and completed in 1829, which is $13\frac{1}{2}$ miles long; and the Chesapeake and Ohio Canal, begun in 1828 and completed as far as Cumberland, its present terminus, a distance of 186 miles, in 1850, some years after the Baltimore and Ohio Railroad had reached the same point.

Railroad enterprises in Maryland began with the incorporation of the Baltimore and Ohio Railroad Company in 1827. Actual building was started by this company in 1828 and by 1830 15 miles had been constructed. During the next two decades railroad building proceeded with

greater rapidity, and by 1850 there were 259 miles of railroads within the state. In 1909 this had been increased to 1394.19 miles. Beside the Baltimore and Ohio Railroad the other important lines are the various railroads under the control or management of the Pennsylvania system, the Western Maryland, the Maryland and Pennsylvania, and the Norfolk and Western railroads, and the two interurban electric railways—the Washington, Baltimore and Annapolis, and the Baltimore and Annapolis Short Line.

FOREIGN COMMERCE.—The foreign commerce of Maryland is confined to the port of Baltimore. The number of foreign vessels entered in the year 1910 was 865, and in the year 1914 was 1037. The total value of the



FIG. 13.—A MODERN ALL-STEEL COAL TRAIN ON THE BALTIMORE AND OHIO RAILROAD.

imports in the former year was \$32,377,480, and in the latter \$29,555,672. The number of foreign vessels cleared in the year 1910 was 878, and in the year 1914 was 1034. The total value of the exports in the former year was \$74,067,406, and in the latter \$106,822,295. The most important imports in the order of their value are pig iron, cork manufactures, iron ore, nitrate of soda, bananas, muriate of potash, toys and dolls, manganese ore, fertilizers, and burlaps. The most important exports are grain, copper, tobacco, cotton, flour, iron and steel manufactures, coal, agricultural implements, lards, meats, etc., lumber and lumber manufactures.

REVENUE, DEBTS, AND TAXATION.—The total assessed value of state property for state levy in 1915 was \$1,274,824,811, of which \$947,648.60

is subject to the full state tax of $.32\frac{1}{2}$ cents on the \$100, the balance including securities and savings deposits being subject to lower fixed rates. The amount raised in this manner is used to meet the public school tax, the maintenance of roads tax, and interest on the various loans. The other expenses of the state are met from licenses, fees, etc.

The total funded debt of the state on September 30, 1915, was \$22,685,880. As an offset to this the state held stocks, bonds, and cash to the credit of the sinking funds of a value of \$6,210,589, leaving a net debt of \$16,595,291. Among the assets of the state is a perpetual annuity of the Northern Central Railroad Company of \$90,000, which has a value of \$2,000,000 and upwards which would still further reduce the net debt.

The disbursements of the state for the year ending September 30, 1915, amounted to \$11,263,751.09, and there was on that date in the treasury after deducting the amounts due to sinking funds \$846,900.96. The state, however, owed to "dedicated funds" \$1,018,769.11, and to unpaid balances of appropriations \$1,274,687.70, leaving a total deficiency on that date of \$1,446,555.81.

There is nothing in the constitution of the state limiting the power of the General Assembly to authorize bond issues either by the state or by its municipalities, except that "the credit of the state shall not in any manner be given, or loaned to, or in aid of, any individual, association or corporation, nor shall the General Assembly have the power in any mode to involve the state in the construction of works of internal improvement, nor in granting any aid thereto, which shall involve the faith or credit of the state."

An Act of Assembly in 1914 exempts from taxation for 1914 and thereafter all bonds or other obligations hereafter to be issued by the state or any county, city or municipal corporation, or other political subdivision, and all such securities heretofore issued by any county or municipal corporation which have been sold under terms rendering such county, city or municipal corporation liable for the state tax thereon.

The total assessed value of Baltimore City property for city levy in 1915 was \$818,102,213. The full city tax rate was \$1.92 per \$100, the

suburban rate \$1.28, the rural rate \$0.65, the securities rate \$0.30, and the savings bank rate \$0.18 $\frac{3}{4}$. The total appropriations for the year were \$23,791,502.64. The total funded debt issued to January 1, 1915, amounted to \$87,467,679.50.

GEOLOGY

The State of Maryland is so situated as to display, in spite of its comparatively small size, a remarkable sequence of geological formations. The most ancient rocks which made up the earth's crust as well as those still in the process of deposition are here found, while between these wide limits there is hardly an important geological epoch which is not represented. It is doubtful whether any other state in the Union contains as full a history of the earth's past.

All of the oldest rocks which are to-day entirely without, or with only slight traces of former life, are referred to the first great division of geological history called *Archean Time*. These oldest rocks are largely crystalline in character, so that there can be but little chance of encountering organic forms, even had they once existed in the strata. Even the least altered deposits, although they have afforded a few scattered remains of archaic forms at certain points, contain nothing more than the merest traces of the organisms of this early time.

When, however, life does once appear in all its variety, it is well-nigh the same in all the older rocks. In the most widely separated localities the same types recur in rocks of the same age, and this furnishes us with the key to the succession of deposits. From the time when the oldest fossil-bearing stratum was deposited until now, the story of life-progress and development is told by the rocks with sufficient clearness to be unmis-takable. Local differences of conditions have probably always prevailed, as they do now, but the same types of organisms have always lived at the same time over the entire globe, so their remains serve as sufficient criteria for the correlation of the strata which contain them. The sequence of life-forms once made out gives us, for the whole earth, the means for fixing the order of deposits even when this is most profoundly disarranged by foldings of the strata into mountains, or by other earth movements.

Geologists distinguish three principal divisions in the history of life as read in the record of the rocks. During the earliest of these great time-divisions, archaic forms of life flourished—uncouth fishes, crustaceans, mollusks, and tree-ferns—most of them very unlike those now extant. On this account this is known as the period of most ancient life, or *Paleozoic Time*. To this succeeded a long lapse of ages when enormous reptiles predominated, associated with other types more like those that now inhabit the globe. To this is given the name of middle life, or *Mesozoic Time*. Finally living things began to assume the form and appearance with which we are familiar, so that this last grand time-division, which includes the present, is designated as the period of recent life, or *Cenozoic Time*.

Each of these three grand divisions of geologic time is in its turn separated into shorter subdivisions called *Periods*, characterized by their own peculiar types of life; and the several periods themselves are divided into *Epochs*, which vary more or less in character according to the region where they are developed. For this reason the chronological and stratigraphical divisions require an independent nomenclature, although this duality of geological classification can in most instances be readily adjusted to the contingencies of each district. The stratigraphical divisions are usually designated by local terms, and are known as *Formations*.

In Maryland there are representatives not merely of the great time-divisions, but of each subordinate period, as well as of many of the epochs. This may be best appreciated by referring to the accompanying table of geological formations.

TABLE OF MARYLAND GEOLOGICAL FORMATIONS

SEDIMENTARY ROCKS

AGE	FORMATION
Cenozoic.	
Quaternary.	
Recent.	
Pleistocene	Talbot
	Wicomico
	Sunderland
	} = Columbia Group.

AGE	FORMATION
Tertiary.	
Pliocene (?)	Brandywine.
Miocene	St. Mary's
	Choptank
	Calvert
Eocene	Nanjemoy
	Aquia
Mesozoic.	
Cretaceous.	
Upper Cretaceous.	Rancocas.
	Monmouth.
	Matawan.
	Magothy.
	Raritan.
Lower Cretaceous.	Patapsco
	Arundel
	Patuxent
Triassic	Newark.
Paleozoic.	
Permian	Dunkard
Carboniferous.	
Pennsylvanian	Monongahela
	Conemaugh
	Allegheny
	Pottsville
Mississippian	Mauch Chunk.
	Greenbrier.
	Pocono.
Devonian.	
Upper Devonian	Catskill.
	Jennings.
	Chemung.
	Portage.
	Genesee.
Middle Devonian	Romney.
	Hamilton.
	Marcellus.
Lower Devonian	Oriskany.
	Helderberg.
	Becraft.
	New Scotland.
	Coeymans.
Silurian	Tonoloway.
	Wills Creek.
	McKenzie.
	Clinton.
	Tuscarora.

AGE	FORMATION	
Ordovician	Juniata	{ Peach Bottom slate. Cardiff quartzite. Octoraro phyllites and schist.
	Martinsburg	
	Chambersburg	
	Stones River	
	Beekmantown	
Cambrian	Conococheague	{ Cockeysville marble. Setters quartzite and mica schist. Susquehanna mica schist.
	Elbrook	
	Waynesboro	
	Tomstown	
	Antietam	
	Harpers	
	Weverton	
	Loudon	
Archean.		
Algonkian	Baltimore gneiss (in part).	

IGNEOUS ROCKS

AGE	FORMATION
Mesozoic.	
Triassic	Diabase.
Paleozoic-Archean	Pegmatite.
	Peridotite, pyroxenite and serpentine.
	Basic volcanics-Meta-andesite, meta-basalt.
	Acid volcanics-Meta-rhyolite.
	Granites and monzonites.
	Gabbro, norite, meta-gabbro.
	Baltimore gneiss (in part).

The separateness of the formations is less pronounced in the two divisions of the Coastal Plain, although the northeast-southwest trend of the nearly horizontal beds produces a predominance of the later Cenozoic formations on the Eastern Shore and of the Mesozoic and early Cenozoic deposits on the Western Shore.

In the Piedmont Plateau the twofold character of the province is more marked geologically. On the eastern side of Parrs Ridge the ancient sediments are highly metamorphosed by a development of new textures and minerals due to the recrystallization of the material under great pressure. This division is also marked by the presence of large masses of granular igneous rock which consolidated at great depths beneath the surface of the earth. On the western side of the median ridge the sediments

are less metamorphosed and less thoroughly recrystallized, although their original textures have been more or less obliterated. There is also marked lack of deep-seated igneous rocks which are here represented by smaller masses of surface volcanics, both acid and basic, which have been less thoroughly recrystallized than their analogues in the eastern district. Along the western border of this western district, between the Monocacy and the mountains, the early Paleozoics have only slightly changed, the blue limestones of the Frederick Valley resembling the contemporaneous limestones of the Hagerstown Valley farther west. Immediately east of the mountains the earlier rocks are covered with the slightly inclined unmetamorphosed red and gray sandstones and conglomerates of Mesozoic age and intruded by the diabase dikes of the same period.

The threefold division of the Appalachian Region corresponds approximately to the threefold division in the sequence of the Paleozoic strata. The Blue Ridge and Great Valley are made up largely of Cambrian and Ordovician beds, in places so developed or eroded as to expose the associated igneous rocks; the Appalachian Mountains proper are made up of sharply folded Silurian and Devonian strata, each easily recognized by the characteristic life-forms; while the Alleghany Plateau is mainly composed of more gently folded later Devonian and Carboniferous deposits, carrying the valuable coal seams of the Cumberland basin.

Such, in brief, is the distribution of the geological formations in Maryland and their connection with easily recognized types of surface configuration occurring within the state. The sequence is of remarkable completeness and of great interest on account of the many types of topography and soils which the various formations produce.

PHYSIOGRAPHY

The State of Maryland forms a portion of the Atlantic slope which stretches from the crest of the Alleghanies to the sea, and is divided into three more or less sharply defined regions known as the Coastal Plain, the Piedmont Plateau, and the Appalachian Region. These three districts follow the Atlantic border of the United States in three belts of varying

width from New England southward to the Gulf of Mexico. Maryland is, therefore, closely related in its physiographic features to the states which lie to the north and south of it, while its central location on the Atlantic border renders the Maryland section perhaps the most characteristic in this broad tract. In crossing the three districts from the ocean border the country rises at first gradually and then more rapidly until it culminates in the highlands of the western portion of the state.

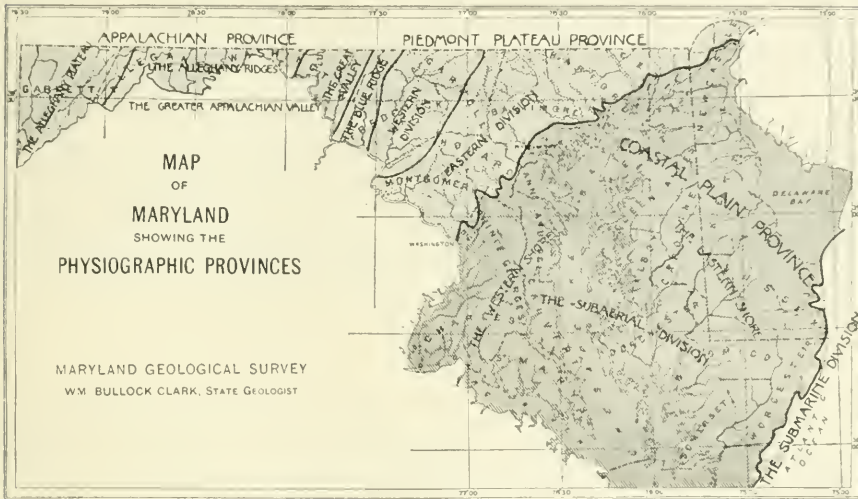


FIG. 14.—MAP SHOWING THE PHYSIOGRAPHIC PROVINCES.

The physical features of a country to no inconsiderable degree determine the pursuits of its inhabitants, and these indirectly affect their social, political, and financial welfare. The residents of mountainous districts have their peculiar occupations, while those of the lowlands find their employment in other ways. In regions bordering the sea or inland bodies of water, still other means of livelihood are sought by the people. The character of the soil and its adaptability to particular crops become also important factors, while the underlying rocks, not only by their influence upon the conditions of life already described, but also by their inherent wealth in mineral resources, still further influence the well-being of the

community. It becomes necessary, therefore, to know something of the physical features of a country, or a state, if one would understand its past history or indicate the lines of its future prosperity.

COASTAL PLAIN

The Coastal Plain is the name applied to the low and partially submerged surface of varying width extending from Cape Cod southward through Florida and confined between the Piedmont Plateau on the west and the margin of the continental shelf on the east. The line of demarcation between the Coastal Plain and the Piedmont Plateau is sinuous and ill-defined, for the one passes over into the other oftentimes with insensible topographic gradations, although the origin of the two districts is quite different. A convenient, although somewhat arbitrary, boundary between the two regions is furnished in Maryland by the Baltimore and Ohio Railroad in its extension to Washington. The eastern limit of the Coastal Plain is at the edge of the continental shelf. In the vicinity of Maryland this is located about 100 miles offshore at a depth of 100 fathoms beneath the surface of the Atlantic Ocean. It is in reality the submerged border of the North American continent which extends seaward with a gently sloping surface to the 100-fathom line. At this point there is a rapid descent to a depth of 3000 fathoms where the continental rise gives place to the oceanic abyss.

THE DIVISIONS OF THE COASTAL PLAIN

The Coastal Plain, therefore, falls naturally into two divisions, a submerged or *submarine division* and an emerged or *subaerial division*. The seashore is the boundary line which separates them. This line of demarcation, although apparently fixed, is in reality very changeable, for during the geologic ages which are past it has migrated back and forth across the Coastal Plain, at one time occupying a position well over on the Piedmont Plateau, and at another far out to sea. At the present time there is reason to believe that the sea is encroaching on the land by the slow subsidence of the latter, but a few generations of men is too short a period in which to measure this change.



FIG. 15.—SAND DUNES NEAR OCEAN CITY, WORCESTER COUNTY.



FIG. 16.—VIEW OF A SAND SPIT, MOUTH OF FAIRLEE CREEK, KENT COUNTY.

The subaerial division is itself separable in Maryland into the Eastern Shore and the Western Shore. These terms, although first introduced to designate the land masses on either side of Chesapeake Bay, are in reality expressive of a fundamental contrast in the topography of the Coastal Plain. This difference gives rise to an Eastern Shore and a Western Shore type of topography. Chesapeake Bay and Elk River separate the



FIG. 17.—VIEW SHOWING THE NEARLY-HORIZONTAL MIOCENE FORMATIONS OF THE CALVERT CLIFFS, CALVERT COUNTY.

two. But fragments of the Eastern Shore type are found along the margin of the Western Shore at intervals as far south as Herring Bay, and again from Point Lookout northwestward along the margin of the Potomac River. On the other hand an outlier of the Western Shore type of topography is found at Grays Hill in Cecil County at the northern margin of the Eastern Shore. The Eastern Shore type of topography consists of flat, low, and almost featureless plains, while the Western Shore is a rolling

upland, attaining four times the elevation of the former and resembling the topography of the Piedmont Plateau much more than that of the typical Eastern Shore. It will be seen later that these two topographic types, which at once strike the eye of the physiographer as being distinctive features, are in reality not as simple as they first appear, but are built up of a complex system of terraces dissected by drainage lines.

The Coastal Plain of Maryland, with which most of the State of Delaware is naturally included, is separated from that of New Jersey by the Delaware River and Delaware Bay and from that of Virginia by the Potomac River; but these drainageways afford no barriers to the Coastal Plain topography, for the same types with their systems of terraces exist as well in New Jersey and Virginia as in Maryland.

The Chesapeake Bay, which runs the length of the Coastal Plain, drains both shores. From the Western Shore it receives a number of large tributaries among which may be mentioned the Northeast, Susquehanna, Bush, Gunpowder, Patapsco, Magothy, Severn, South, Patuxent, and Potomac rivers. On the Eastern Shore its principal tributaries consist of Bohemia Creek, Sassafras, Chester, Choptank, Nanticoke, Wicomico, and Pocomoke rivers. These streams, which are in the process of developing a dendritic type of drainage, have cut far deeper channels on the Western than on the Eastern Shore. If attention is now turned to the character of the shore line, it will be seen that along Chesapeake Bay it is extremely broken and sinuous. A straight shore line is the exception, and in only one place, from Herring Bay southward to Drum Point, does it become a prominent feature. These two classes of shore correspond to two types of coast. Where the shore is sinuous and broken, it is found that the coast is low or marshy, but where the shore line is straight, as from Herring Bay southward to Drum Point, the coast is high and rugged, as in the famous Calvert Cliffs which rise to a height of 100 feet or more above the Bay. The shore of the Atlantic Ocean is composed of a long line of barrier beaches which have been thrown up by the waves and enclose behind them lagoons flushed by streams which drain the seaward slope of the Eastern Shore. Of these Chincoteague Bay is the most important.

The Coastal Plain contains five broad terraces designated from the oldest to the youngest by the names of Brandywine, Sunderland, Wicomico, Talbot, and Recent, after the geological formations of the same name. The first four and part of the fifth fall within the subaerial division, and

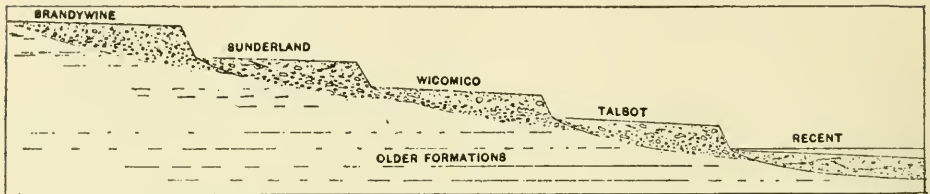


FIG. 18.—DIAGRAM SHOWING RELATIVE POSITION OF COASTAL PLAIN TERRACES.

the last one principally within the submarine division of the Coastal Plain. All five of the subaerial terraces are found on the Western Shore, while only three of them occur on the Eastern Shore. These terraces wrap about each other in concentric arrangement and are developed one above the other in order of their age, the oldest standing topographically the highest.

Stream Valleys.

Four generations of stream valleys can be discerned in the Coastal Plain of Maryland. Three of these no longer contain the streams which cut them. They have been referred to in the discussion as re-entrants penetrating the various terraces. The first is found developed



FIG. 19.—GEOLOGICAL SECTION PORT DEPOSIT TO SASSAFRAS RIVER.

as a flat-bottomed drainageway of greater or less width and extent, running up into the Brandywine terrace. Its level bottom is an integral part of the Sunderland terrace. The second one of these drainageways penetrates the Sunderland terrace in a similar way. Its characteristics

are analogous to those entering the Brandywine terrace and its flat bottom forms an integral part of the Wicomico terrace. The third of these drainageways cuts a re-entrant within the body of the Wicomico terrace and its level floor forms an integral part of the Talbot terrace. The fourth and last of these drainageways is now in the process of formation. It is the system of valleys which are being cut by the Recent streams. Toward their headwaters these valleys are narrow and V-shaped, and if traced to their sources are often found to start from intermittent springs surrounded by a steep-walled amphitheater from 5 to 10 feet in height. Toward their lower courses these valleys are broad and flat and are frequently filled with fresh or brackish-water marshes. In the upper portions of their courses the valleys are being eroded. In the lower portions they are being filled. A glance at the map will serve to confirm the opinion which has been held for a long time, namely, that the rivers of the Coastal Plain of Maryland have been drowned along their lower courses, or, in other words, have been transformed into estuaries by the subsidence of the region. The filling of these valleys has taken place toward the heads of these estuaries. The headwaters of these Recent valleys are being extended inland toward the divides with greater or less rapidity.

Many of the tributary streams occupy the re-entrant valleys described above. The more energetic have succeeded in carrying out all of the ancient floors which formerly covered these valleys and formed a portion of the various terraces. Others have left mere remnants of these valley accumulations along the margins, while the less active streams have left the re-entrant valleys practically unmodified. In Southern Maryland the streams which drain into Chesapeake Bay from the eastern slope of Calvert County, as well as those which drain into the Patuxent River from St. Mary's and Prince George's counties, have shorter courses than those which drain into the Patuxent from Calvert County or into the Potomac from Prince George's, Charles, and St. Mary's counties. A similar contrast is obvious between the streams which enter the Atlantic Ocean from the Eastern Shore and those which enter Chesapeake Bay from the same region.

The cause of this shortening of streams on the northeast side of these divides is probably due not only to a tilting toward the southeast but also in a great measure, particularly along the Bay shore, to rapid wave erosion. The streams draining the eastern slope of Calvert County and the northeastern slope of St. Mary's and Prince George's counties were at one time longer, but the recession of the shore line has shortened their courses by the cutting away of their lower valleys. This is very clearly shown along the Calvert Cliffs where the waves have advanced so rapidly on the land that the former heads of stream valleys are now left as unoccupied depressions along the upper edge of the cliffs, while other streams cascade from the top of the precipice to the shore beneath, and still others more active have been able to sink their valleys to the water's edge by a very sharp descent. Other investigations have suggested that earth rotation may have had some influence in bringing the streams mentioned above into their present position, and although the streams are short, it is possible that they have been somewhat affected by this influence.

ECONOMIC PHYSIOGRAPHY OF THE COASTAL PLAIN

SOILS.—The various geological stages through which the Coastal Plain has passed have had considerable influence upon the soils, and through them upon the crops of the province. The early strata, those of Cretaceous and Eocene age, which are best developed in parallel belts along the northwestern boundary of the Coastal Plain, are sandy loams which yield good returns of fruit and garden truck. In this belt the very prosperous peach—and other fruit—farms have been located, and large quantities of fine peaches are still shipped from the northern counties of the Eastern Shore. The same belt extends northeastward into Delaware and New Jersey, where similar crops are raised. These strata carry with them a natural storehouse of valuable fertilizer in the form of greensand or glauconitic shell marl. In the early days of Eastern Shore farming this marl was much used as a fertilizer, particularly in Cecil, Kent, and Queen Anne's counties.

In the central and southern counties the clayey loams which come from the Miocene or Chesapeake deposits afford extensive areas of good wheat, grass, and tobacco lands, which formerly were of great importance to the

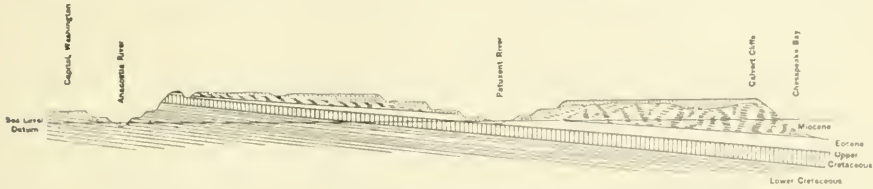


FIG. 20.—GEOLOGICAL SECTION WASHINGTON TO CALVERT CLIFFS.

state. Since the rapid development of the wheat fields of the West, however, the yield of these lands has become comparatively insignificant, so that at present the farmers are not able to make wheat crops pay even by the aid of expensive fertilizers. Among the best-paying crops of the Coastal Plain are the products of the lighter sandy loams of the Pliocene and Pleistocene deposits. These soils cover the whole Eastern Shore south of the Choptank and are also of importance on the more dissected Western Slope. Large and early crops of berries and melons are annually shipped from the cultivated areas of these soils, and the canning of tomatoes, corn, and other products constitutes one of the important industries of the province.

WATERWAYS.—The post-Brandywine and the post-Pleistocene submergences of the Coastal Plain have been of immense benefit to the inhabitants of Maryland. As a result of the drowning of the Chesapeake



FIG. 21.—GEOLOGICAL SECTION CAMBRIDGE TO ATLANTIC OCEAN.

River, ocean-going vessels are admitted as far inland as Georgetown, D. C., Baltimore, Havre de Grace, and Chesapeake City. Valuable harbors also are provided, so that much commerce has been attracted to Maryland

shores. Besides interstate and international trade which is thus favored by the configuration of Chesapeake Bay with its deep exit to the high seas, trade within the state is greatly benefited by these waterways. That geologically recent submergence, whereby the river valleys carved in post-Pleistocene times were drowned for more than half their length, gave to the inhabitants of the Coastal Plain the most favorable facilities for easy and cheap transportation of their crops. The estuaries then formed are the entrances to tidal streams that penetrate into the very heart of the rich lands. They are generally of sufficient depth to admit the light-draught steamers plying on the waters of Chesapeake Bay, and the numerous wharves which are encountered on ascending any one of the navigable creeks testify to the readiness with which the people have availed themselves of their natural opportunities. In the proper seasons these wharves may be seen piled high with the crates of fruit and other products which are being sent to Baltimore for distribution among the neighboring states.

Besides thus affording easy paths of intercourse with other important sections of the state, the estuaries yield peculiar and characteristic products of their own. The same streams which, during the summer, are the arteries and highways of a commerce based on the products of the soil, become in winter the fields of one of Maryland's greatest industries—the oyster fisheries. Great quantities of these oysters are annually sent to Baltimore, and their gathering has given rise to a race of hardy fishermen and expert sailors only excelled by the cod fishers who sail every year to the Great Banks of Newfoundland. The oyster-canning industry, whereby the interior of the continent is supplied with canned oysters, has also arisen as an indirect result of the post-Pleistocene submergence. The diamond-back terrapin, the duck and other wild fowl of the littoral marshes also deserve a place among the list of resources which the geographic history of the province has bestowed upon this state.

RAILROADS.—While the many waterways which intersect the Coastal Plain have given boat traffic the best start among transportation facilities, railroads have been built to a number of points, thus connecting them more directly with the vigor and energy of the great commercial centers of

Baltimore, Philadelphia, and New York. Generally the railroad, seeking as it does that course which requires the least modifications from the natural topography in order to make an easy grade, has to pursue a more or less tortuous route. On the Eastern Shore the low and almost insignificant character of the divides and the shallow stream valleys permit the roads to run in the very direct routes from one objective point to the next. A glance at the map of the state shows these routes and the indifference which they display towards the divides. It is also noteworthy that, although touching at several water-side towns, the railroads are confined on the whole to those wider portions of the small peninsulas where the hauling distance to the boat lines becomes something of a factor in the cost of transportation. By reaching these remoter points they are thus able to maintain a foothold in spite of the lower rates offered by the boat lines. On the peninsula of Southern Maryland the few railroads are compelled to hold pretty closely to the divides, as a short distance on either side the country becomes so cut up that it would be wholly impracticable to build a line.

EFFECT OF TOPOGRAPHY UPON THE INHABITANTS.—When the early settlers came to Maryland they found the tracts of the Coastal Plain occupied by peaceful tribes of Indians who lived by fishing in the deeply-indented rivers and hunting through the pine and hardwood forests which covered the interstream areas. The settlers themselves took to farming, encouraged by the rich soils, and also obtained plenty of fresh fish and oysters from the neighboring waters. Soon large and prosperous plantations grew up, which afforded by their products good incomes to their owners. The earlier inhabitants were thus mainly agriculturists. As the value of the oyster beds increased, and the demands for the oyster grew, the race of oystermen sprang up. These men naturally settled along the shores near their work. At present the two classes, which originally must have been somewhat mixed, can be clearly distinguished, the regular farmer keeping to the higher interfluviatile areas, while along the shores and in the vicinity of the large towns are the houses of the oystermen. On the Western Shore the dissection of the interior lands near the Bay has

handicapped the farmer very decidedly, while the deep rivers and estuaries give good opportunity for the fishermen to ply their trade.

Thus the geological and physical features of the Coastal Plain, which are the direct results of its geological history, are seen to have almost wholly determined the pursuits and the habits of its settlers and inhabitants.

THE PIEDMONT PLATEAU

The Piedmont Plateau, which is the name applied to the hill country that borders the Coastal Plain on the west and extends thence to the foot of the Appalachian Mountains, is a low plateau of complex origin whose rolling surface is traversed by highlands and cut by valleys that

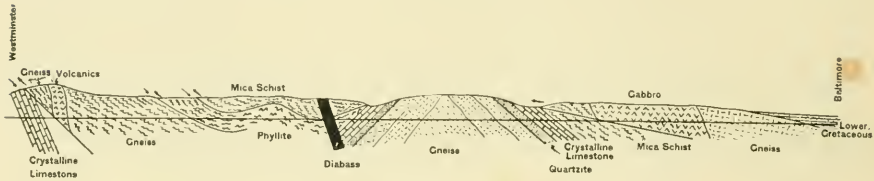


FIG. 22.—GEOLOGICAL SECTION WESTMINSTER TO BALTIMORE.

at times trench the uplands as deep gorges. From the fact that the physiographic features of the Appalachian Region which lies to the westward are contemporaneous in origin with those of the Piedmont Plateau, it is reasonable to suppose that no sharp line can be drawn between the two districts. The boundary can in fact with almost equal propriety be placed at the foot of North Mountain as at the foot of the Catoctin Mountain, although, all things considered, it has seemed best in Maryland to divide the two regions at the point where the first pronounced mountain range is reached.

To the northward the Catoctin and Blue Ridge highlands with their South Mountain extension in southern Pennsylvania gradually decline to the level of the lower plateau, and the surface of the Piedmont hill country with higher lands of inconspicuous elevation extends to the foot of the Alleghany ranges. To the southward, on the other hand, the Great Valley is less pronounced and the highlands of the Blue Ridge become a con-

spicuous part of the great Appalachian Region. In the south also the name Piedmont has become so widely intrenched in usage for the district lying to the eastward of the Blue Ridge mountains that it has seemed best to follow the same usage in Maryland.

THE DIVISIONS OF THE PIEDMONT PLATEAU

The Piedmont Plateau is divided into two regions called, respectively, the eastern division and the western division, which are separated by Parrs Ridge that gradually rises to an elevation of several hundred feet above the general surface of the Piedmont Plateau. This highland has an average elevation of 800 to 900 feet, rising to the northward in Carroll County and in the nearby regions of Pennsylvania to 1100 feet, but gradually declining southward across Howard and Montgomery counties

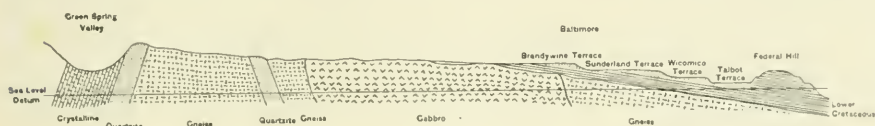


FIG. 23.—GEOLOGICAL SECTION GREEN SPRING VALLEY TO FEDERAL HILL.

until it reaches the lowland elevations of the Piedmont Plateau toward the Potomac Valley.

Parrs Ridge forms the divide between the streams flowing directly into the Chesapeake Bay and those flowing into the Potomac River. Among the more important streams entering the Chesapeake from the eastern division of the Piedmont are the Susquehanna, Bush, Gunpowder, Patapsco, and Patuxent rivers. The western division is largely drained by the Monocacy River and its tributaries into the Potomac River.

THE PIEDMONT PENEPLAINS

The Piedmont Plateau is made up of remnants of old plains cut out of the high plateau that formerly stretched across the district from the Appalachian Region and passed beneath tide just beyond the edge of the Coastal Plain, where it now forms the floor on which the Coastal Plain sediments rest. The eastern division is much less deeply eroded than the

western, with the result that more frequently remnants of the oldest plains are found in the former than in the latter district. On the other hand, the later plains, but poorly developed along the eastern margin of the Piedmont, become gradually more pronounced westward, the youngest plains being well defined in the drainage basins of the Monocacy and along the Potomac. These old plains, now represented only by remnants of their earlier surfaces, are technically known as peneplains by physiographers. A *peneplain* is the name given to an area that has been reduced by erosion to approximately a level surface but little above the sea level of the period of its formation, but which may still have unreduced knobs or *monadnocks* in the interstream areas. Even where these monadnocks have largely wasted away the valley surfaces would naturally be somewhat lower than the divides and would rise slowly to the sides of the valleys as well as from the lower courses of all the streams to their heads. It is important to keep these facts in mind when endeavoring to reconstruct the ancient peneplain surface from the remnants of the old plains that are still left in the Piedmont district. It so happens that after the formation of the oldest peneplain now represented, later erosion has only resulted in the partial development of new plains, highlands, sometimes of wide extent, still remaining as monadnocks in the interstream areas.

The several plains recognized in the Piedmont district are known as the Schooley, the Weverton, the Harrisburg, and the Somerville peneplains, all of which, like the district to which they belong, have been traced far beyond the confines of the state.

STREAM VALLEYS

The present streams are now found in valleys of variable depth that trench the peneplain surfaces. In the eastern division of the Piedmont, where the Harrisburg and Somerville plains are at best but poorly developed, the streams appear for the most part as trenches in the Weverton plain. In the western division, on the other hand, they are found trenching the later peneplains and in the lower Monocacy and Potomac valleys the relations of the streams to the Somerville peneplain are clearly defined.



FIG. 24.—VIEW OF THE GORGE OF THE SUSQUEHANNA RIVER BETWEEN HARFORD AND CECIL COUNTIES.

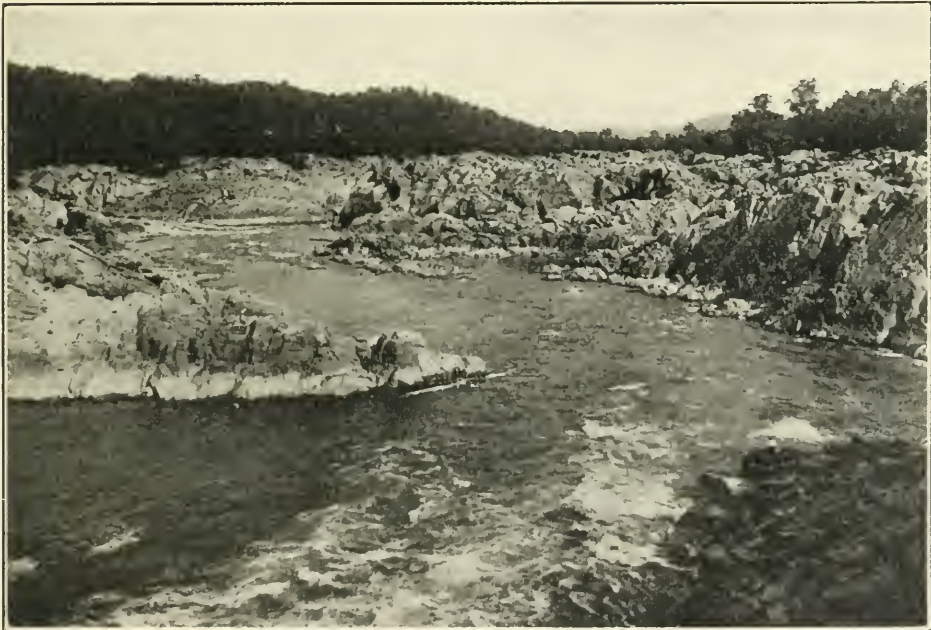


FIG. 25.—THE GREAT FALLS OF THE POTOMAC.

Some of these streams are more or less adjusted to the underlying rocks, as in the case of Jones Falls to the north of Baltimore; but a large portion of them are discordant, that is, seemingly unaffected by the rocks over which they flow. In the eastern division of the Piedmont the streams flow down the eastern slope of Parrs Ridge in approximately parallel courses to Chesapeake Bay, and in many instances the streams cut across the rocks with little regard to their physical characters. In the case of the Monocacy and its tributaries, we find that there has been little adjustment of the channels, the streams taking their courses across limestones, phyllites, and shales indifferently.

In general, both the main streams and their tributaries show drainage patterns similar to those of the Coastal Plain, and it is not impossible that the stream courses may have been in many instances superimposed on the rocks at no distant time in the past through a mantle of Coastal Plain sediments. Remnants of such a cover have been found far removed from the main body of the Coastal Plain, even as far westward as the Great Valley.

ECONOMIC PHYSIOGRAPHY OF THE PIEDMONT PLATEAU

The physiography of the Piedmont Plateau has materially influenced the settlement and occupation of those who chose this region for their homes.

SOILS.—The early settlers, having to raise all their food, naturally sought out the best locations for their broad farms and beautiful estates. On their arrival they found two general classes of farm lands.

The first class embraced the somewhat rolling but extensive tracts of the interstream upland areas. The soils were found to be good producers of corn, wheat, and grass, and the surface not so rough as to make its cultivation forbiddingly difficult. The long, continuous tracts of these interstream areas also made travelling easy, as long as one stayed on the upland, while the stream valleys were shut in and narrow. For these reasons, probably, the various stately manor lands were laid out where the upland expanses were greatest; and the mansions, surrounded by fine

groves and broad fields, were located on the most promising of the small plateaus. In the earlier days the crops from these broad, upland farms were among the richest in the state and rivalled those of the Eastern Shore.

The second class of farm lands comprised the alluvial loams and sandy flood-plains along the streams. These lands are generally restricted in area, since the valley bottoms are usually narrow and limited in extent. Where streams have opened out lowlands on the marble and limestone areas, rich lands of considerable extent offer most favorable farm sites. The lands along the streams have the advantage of running water and good springs from the hill sides. They are not as well drained, however, as are the lands of the upland, and they are subjected to damaging floods. Comparatively few settlers chose the valley lands at first.

A marked exception to the above rule is found in the Monocacy Valley, where the farm lands are all located on the several benches and terraces leading down to the river or on the bottom-lands belonging to it. So little of the old upland is left that the conditions of occupation are quite different from those farther east.

STREAMS.—While the farming class were searching for good soils and favorable homestead sites, the manufacturers and millwrights were seeking favorable locations for mills, dams, and flumes. The streams of the Piedmont Plateau yielded a great abundance of waterpower, and soon mills dotted the valleys. Each section early came to be supplied with its grist mill, and in due time cotton mills were also built. These industries in time became of great importance. The flour mills are now generally abandoned, however, only a few of the most favorably situated ones having been able to maintain themselves against western competition. The cotton mills have held out much better, because it has not been until recent years that southern cotton has been spun and woven at home.

The waterpower which the Piedmont streams furnish is not the only wealth which they bring to the state. The land movements during late geological time have caused the streams to trench their courses considerably, and in so doing have rendered accessible the building stones

which were previously hidden beneath the surface. The granites now extensively quarried at Port Deposit would not be so easily obtained and shipped had not the Susquehanna River cut its deep gorge. The locations of the serpentine quarries of Harford County are determined to a greater or lesser extent by the streams which intersect the rock. A formerly important soapstone quarry on Winter Run in the southeast corner of Carroll County was made possible only through the fact that the stream had there cut a deep gorge in a long band of steatitic serpentine. Along the Patapsco and Jones Falls many quarries of granite and gneiss have been located because the stream gorges offered favorable openings or transportation facilities.

It is interesting, by way of contrast, to compare the different conditions under which the Cardiff-Delta slates are quarried. As no stream cuts across Slate Ridge in the vicinity of those two settlements, the quarries have been located along the summit and are worked entirely from above. This is the most difficult way to attack the slates, and as there is no natural drainage for the quarries the water, which is constantly accumulating in the pits, gradually increases the cost of working.

LINEs OF COMMUNICATION.—The valleys and ridges of the Piedmont Plateau furnish excellent examples of the way in which topographic features influence commerce and human activities.

One of the first acts of the early settlers of the Piedmont region was to lay out highways. These early roads were not always located advantageously with reference to the topography, but both the divides and the valleys were extensively employed. When the better turnpikes came to be built, however, they were almost without exception built along the divides. The reason for this was that fills and bridges were thereby avoided, and better drained roadbeds, not subject to floods, were obtained. Radiating in all directions from Baltimore, these old turnpikes may be followed into almost every corner of the state, and their location on the more elevated ridges enables the traveller to obtain beautiful views of the richly wooded, rolling uplands and tree-filled valleys.

The canals were built to overcome the obstructions to navigation which the "fall line" rapids occasioned, even in the larger streams, such as the Susquehanna and the Potomac.

One of the early canals was the Susquehanna Canal, built along the east shore of the Susquehanna River in order to transport merchandise from the limits of navigation at Port Deposit northward along that stream to the Pennsylvania line. This canal has now wholly fallen into disuse.

Another early and successful canal was constructed around the Great Falls by the Potomac Company. To obtain the necessary water and the most favorable grades this channel, now part of the Chesapeake and Ohio Canal, was laid out along the north bank of the Potomac, taking advantage of the natural trenches cut by that river. This canal was long the cheapest and best means of transportation between the coal and wheat lands of Allegany County and tidewater.

Since the era of railway construction began, every advantage has been taken of the topographic features of the country. The Baltimore and Ohio Railroad crossing the Piedmont Plateau from tidewater found an easy exit from the depression about Baltimore and a gentle, though crooked, grade to the crest of the divide by following up the South Branch of the Patapsco River to Mount Airy, and then along the Monocacy drainage to Point of Rocks.

The Western Maryland Railroad, striking north and then westward, could not utilize the lower course of the North Branch of the Patapsco on account of its narrow valley and very crooked channel. By following the broad, well-graded valley of Gwynns Falls as far as Emory Grove, however, an easy descent was found into the more favorable upper course of the North Branch of the Patapsco and thence an easy grade led to the sag in the divide at Westminster. A branch of the Western Maryland road running north from Emory Grove follows the Gunpowder-Monocacy divide as far as Manchester.

The Northern Central Railway enters the state from the north by following down the main branch of the Big Gunpowder, and does not leave this stream until at Ashland the broad marble lowlands about

Cockeysville open out and offer an easy crossing to the valley and gorge of Jones Falls, which it follows down to Baltimore from Lake Roland.

A striking example is afforded by the Maryland and Pennsylvania Railroad, which takes advantage of the gorge of Deer Creek to penetrate Rocky Ridge. Were it not for the aid thus rendered by the creek the engineers of the road would have been obliged to tunnel through the obstruction or else have gone a number of miles out of a direct course. Deer Creek would not have been located across the quartzite and so could not have cut the gorge had it not accidentally taken this position while flowing on the Coastal Plain covering, from which it was doubtless superimposed upon the quartzite. Besides the railway a county road also utilizes this gap and there are reasons to suppose that before the advent of the white man the Indians also used it as a thoroughfare.

In conclusion, it appears that the topography has very materially controlled the settlement and economic development of the Piedmont Plateau by determining the location of the farms, the mills, and the railroads.

THE APPALACHIAN REGION

The Appalachian Region borders the Piedmont Plateau upon the west and extends to the western limits of the state. It consists of a series of parallel mountain ranges with deep valleys which are cut nearly at right angles throughout much of the distance by the Potomac River. Many of the ranges exceed 2000 feet in elevation, while some reach 3000 and more in the western portion of the district. The streams have been to a large extent adjusted to the rocks over which they flow, although this is less evident in cases of the master stream, the Potomac River, than of the tributaries.

THE DIVISIONS OF THE APPALACHIAN REGION

The Appalachian Region is divided into three districts, known as the Blue Ridge district, the Greater Appalachian Valley, composed of the Great Valley and the Alleghany Ridges, and the Alleghany Plateau. Each district presents certain marked physiographic characteristics that separate it from the adjacent areas on the east and west.

The Blue Ridge district consists of the Catoctin and Blue Ridge mountains uniting to form the greater highland of South Mountain in the southern part of Pennsylvania. Beginning with an elevation of 2000 feet at the Maryland line, this highland gradually declines southward to the Potomac River where it has an elevation of less than 1500 feet at Maryland Heights overlooking the Potomac Valley. The eastern border of this district is formed by the Catoctin Mountain, which extends as an almost unbroken highland from the Pennsylvania line to the Potomac River at Point of Rocks. Succeeding the Catoctin upon the west is the Middletown Valley, which drains southward into the Potomac River through the Catoctin Creek. Along the western side of this district is the Blue Ridge Mountain proper. It extends as a sharply defined range

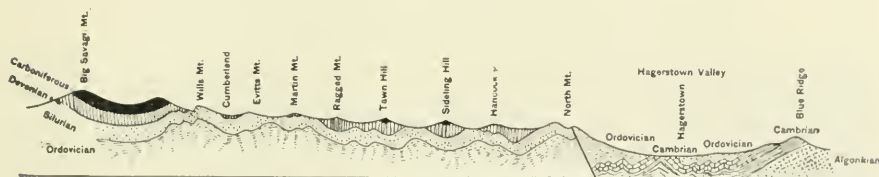


FIG. 26.—GEOLOGICAL SECTION BIG SAVAGE MOUNTAIN TO THE BLUE RIDGE.

from the South Mountain of Pennsylvania to the Potomac River, which it reaches at Weverton. Its crests form the boundary line between Frederick and Washington counties. The Blue Ridge in Virginia is not the direct continuation of the mountains so named in Maryland, but of a smaller range, the Elk Ridge, which adjoins the Blue Ridge on the west and reaches the Potomac River at Maryland Heights opposite Harpers Ferry.

The Greater Appalachian Valley embraces all of the country lying between the Blue Ridge on the east and Dans Mountain or Alleghany Front on the west. It admits of a twofold division into the Great Valley on the east and the zone of Alleghany ridges on the west. The Great Valley, known as the Hagerstown Valley in Maryland, the Cumberland Valley in Pennsylvania, and the Shenandoah Valley in Virginia, is a broad lowland, the floor of which averages from 500 to 600 feet in elevation, gradually increasing in height from the Potomac Valley toward the

Pennsylvania line. It extends from the Blue Ridge on the east to North Mountain on the west. It is drained by the Antietam River on the eastern side and the Conococheague River on the western side, both of these streams having their sources in Pennsylvania and flowing southward to the Potomac River. The Alleghany ridges which extend from North Mountain to the Alleghany Front consist of a series of parallel ridges of



FIG. 27.—VIEW OF THE VALLEY OF MONROE RUN ERODED IN THE SCHOOLEY PENEPLAIN OF THE ALLEGHANY PLATEAU.

varying elevations that extend from north to south across the state. Among the more important are North Mountain, Tonoloway Ridge, Sideling Hill, Town Hill, Green Mountain, Warrior Mountain, Collier Mountain, Martin Mountain, Nicholas Mountain, Shriver Ridge, and Wills Mountain. Between them are valleys that are drained mainly to the southward into the Potomac River. They vary in character, some being narrow and deeply trenched, while in others broad, level-topped areas appear, the origin of which will be shortly discussed.

The Alleghany Plateau forms the western part of the Appalachian Region and extends from the Alleghany Front to the western limits of the state. This highland, like the districts which lie to the eastward, is continued far beyond the confines of the state. To the southward it can



FIG. 28.—CRABTREE CREEK.

be traced through Virginia, Kentucky, and Tennessee to northern Alabama, where it is known under the name of the Cumberland Plateau. In Maryland this district consists of a broad highland across which ranges of mountains extend from northeast to southwest, reaching elevations of

3000 feet and more at several points in Big Savage, Great Backbone, and Negro mountains. The leading ranges of the district are Dans Mountain, Big Savage Mountain, Great Backbone Mountain, Negro Mountain, Winding Ridge, and Laurel Hill. The streams flow in part to the southward or eastward, as the case may be, into the Potomac River, and in part to the northward through the Youghiogheny Valley into the Monongahela River whence the waters reach the sea through the Ohio and the Mississippi. The latter district comprises much the larger part of Garrett County.

THE APPALACHIAN PENEPLAINS

The Appalachian Region, like the Piedmont Plateau, is composed of remnants of old plains which have been cut out from the high plateau, now represented by the level-topped crests of the highest ranges. The several peneplains succeed each other at different elevations, being represented by the low crests or broad, level-topped valleys that are here and there preserved in the highland region.

The peneplains found represented in the Appalachian Region are the continuations westward of the Piedmont peneplains and like them have here and there above the ancient surfaces unreduced knobs or monadnocks in what were probably interstream areas. As in the Piedmont district, the peneplain surfaces rise gradually up the old streams and toward the valley sides.

The Appalachian physiographic history is complicated by the fact that the drainage of the area has evidently changed during the period of peneplain development, the Potomac drainage having gradually encroached upon that of the Youghiogheny to the westward. It is probable, therefore, that the peneplains to the west of the Alleghany Front, as well, perhaps, as those a short distance to the east of the same, cannot be readily correlated with those farther eastward. On account of the higher gradient of the Potomac and its head-water tributaries, compared with the Youghiogheny and the drainage basin of which it is a part, an encroachment of the former would, in accordance with known physio-

graphic laws, naturally result. In this way certain physiographic incongruities and even biological peculiarities in the distribution of the faunas of the present day may be explained.

The peneplains recognized in the Appalachian district are known as the Schooley, Weverton, Harrisburg, and Somerville plains, all of which are found in the Piedmont district to the east.

STREAM VALLEYS

The present valleys have trenched the peneplain surfaces to greater or less depth. Along the Potomac the trenching was mainly post-Somerville,



FIG. 29.—VIEW OF SWALLOW FALLS, YOUGHIOGHENY VALLEY, GARRETT COUNTY.

but up the tributaries, where the Somerville peneplain gradually disappears, the trenching was in part produced at the time of the formation of the Somerville peneplain itself and in some instances represents an even longer period of cutting.

The streams are to a considerable extent adjusted to the present structure, producing what has been described as a trellis or grape-vine system. At times wind-gaps are found cutting the crests of the mountains and representing the location of the streams across the hard rocks before they had been tapped by the tributary of some larger stream flowing along the softer beds, generally in a direction at right angles to the original system.



FIG. 30.—VIEW SHOWING FOLDED SILURIAN ROCKS OF THE APPALACHIAN REGION, WASHINGTON COUNTY.

At the point where the streams cross the hard sandstone ridges deep gorges result, but in the softer beds the channels are frequently wider, with low banks on either side.

ECONOMIC PHYSIOGRAPHY OF THE APPALACHIAN REGION

LINES OF COMMUNICATION.—The obstacles offered by the successive parallel ridges of the Appalachian province delayed the westward movement of the population in colonial days and restricted the east and west

lines of travel to the valleys of the Potomac, the Susquehanna, and the James. The earliest inhabitants found these natural highways already selected as the lines of communication between the distant parts of the great Indian Confederacy, and accepted the experience of the aborigines by building their roads along the same lines.

As the population of the western portions of the state increased, the demand for more perfect highways became urgent, so that before the end of the eighteenth century several well-defined lines of travel had been established between the tidewater regions along the Atlantic and the Ohio drainage. The Cumberland road extended from Washington to Cumberland via Hagerstown and Hancock, and thus followed the line of easiest travel along the valley and across the divides at their lowest points. Beyond Cumberland the road was extended across Big Savage Mountain and the Alleghany Plateau, keeping on the divide between the Potomac and Youghiogheny until it entered the valley of the latter, which it followed to the Monongahela, and thence down stream to Pittsburgh.

Later promoters of the Chesapeake and Ohio Canal gained the right of way up the Potomac Valley which is followed to Cumberland. The course of the Potomac at Harpers Ferry and Point of Rocks offered the easiest means of communication across the Blue Ridge district, and when once occupied the Chesapeake and Ohio Canal effectually stopped the westward progress of the Baltimore and Ohio Railroad along the same route until a compromise was effected in 1832. West of Cumberland the railroads crossing the state follow the valleys of the rivers, utilizing the courses of the Potomac River, Wills Creek, Georges Creek, Jennings Run, the Savage River, and the Youghiogheny River.

NATURAL RESOURCES.—The resources of the Appalachians are varied and valuable. The early settlers found the mountains clothed with dense forests of pine and hardwood, but they lacked the means for transporting the lumber to a ready market. Even now, with a canal and several railroads, the cost of hauling from the forest to the point of shipment is so great as seriously to reduce the profits of the lumbering trade.

The many varieties of soil in the Appalachians are closely related to the geological formations, and their distribution is clearly influenced by the geological structure. Since most of the higher hills and sharp ridges are due to the presence of heavy beds of siliceous sandstone, the soils of the upper slopes are generally sandy and poor. Beneath these strata come beds of shales which are sometimes calcareous, so that the lower slopes, hills, and subsequent valleys contain soils which, while somewhat stony, give fair yields in wheat, corn, etc.

The Great Valley, with its rich limestone soil and easy means of access from the north and south, forms a broad band of the most fertile lands in the state. If it had not been for the re-elevation of the Shenandoah plain this district would be most favorable to farming. As it is, the rolling surface and steep valley slopes are somewhat difficult to till. The land is so rich, however, that the whole stretch of the valley is or might be under cultivation.

The chief sources of mineral wealth in the province are the deposits of coal, iron, and cement rock. The coal beds are the remnants of larger areas preserved by their depression below the limits of erosion during the formation of the Schooley peneplain. They have proved of inestimable value to the people of the state. The Clinton iron ores were formerly very valuable, but in the present state of the iron market they are of relatively little importance. The cement rock is obtained from the Cambro-Ordovician and Silurian limestones and is the basis of a growing industry. The exposures are favorably situated along the lines of travel, so that the mills have every advantage for the shipment of their product.

INHABITANTS.—The physiography, industries, and resources of the Appalachian province have strongly influenced the character and occupation of the inhabitants, who may be grouped into several well-marked classes. In the higher, more rugged and less populated portions of the area are the mountaineers, who gain their livelihood by lumbering and desultory farming. Gathered about the rich deposits of coal, iron ore, and cement are miners, who are occupied almost exclusively in the extraction of wealth from the underlying rocks. They present a class of marked

characteristics in education, training, religion, and nationality. The valleys between the mountains, especially the Great Valley, and the larger, more level areas of the glades, furnish incentive and opportunity for farming communities, which are reasonably well recompensed for their efforts in the tilling of the soil. In the cities and large towns are concentrated those who serve as distributing agents for the products of the land and the necessities of the inhabitants.

THE CLIMATE

The climate of Maryland is as varied as its surface configuration, and is to a considerable extent dependent upon the latter. These climatic

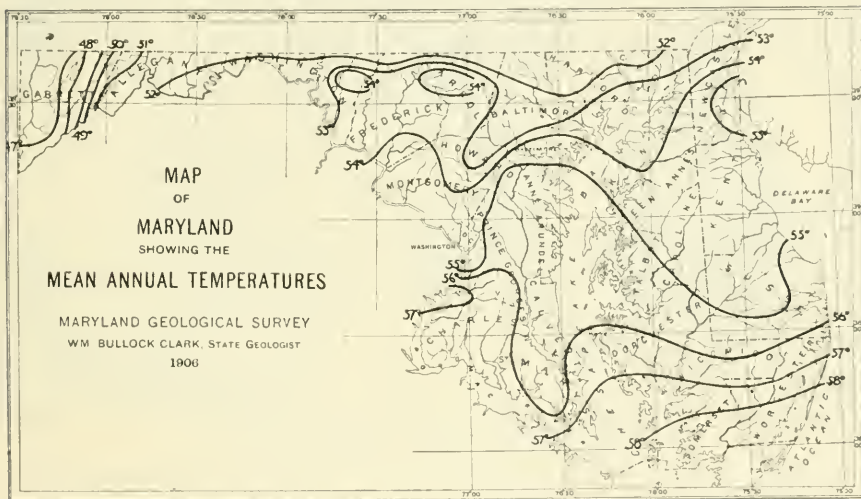


FIG. 31.—MAP SHOWING MEAN ANNUAL TEMPERATURES.

differences are also due to the nearness of the Atlantic Ocean and Chesapeake Bay. The climate of most of the state has the healthfulness common to the eastern part of the United States, and in character is midway between that of Maine and that of Florida. In the eastern and southern parts of the state the winters are mild and the summers hot, while in the western and more elevated portions the winters are quite cold and the summers delightfully cool. The so-called "climatic changes"

depend upon differences in temperature, precipitation, winds, humidity, and barometric pressure.

The average temperature for the year varies materially in the several sections of the state, the temperature of the northern and western divisions, which ranges from an average of 27° in winter to 70° in summer, is several degrees lower than that of the southern and eastern divisions, where the temperature for the winter is on the average about 40° and for summer 77° . In general, the average temperature of

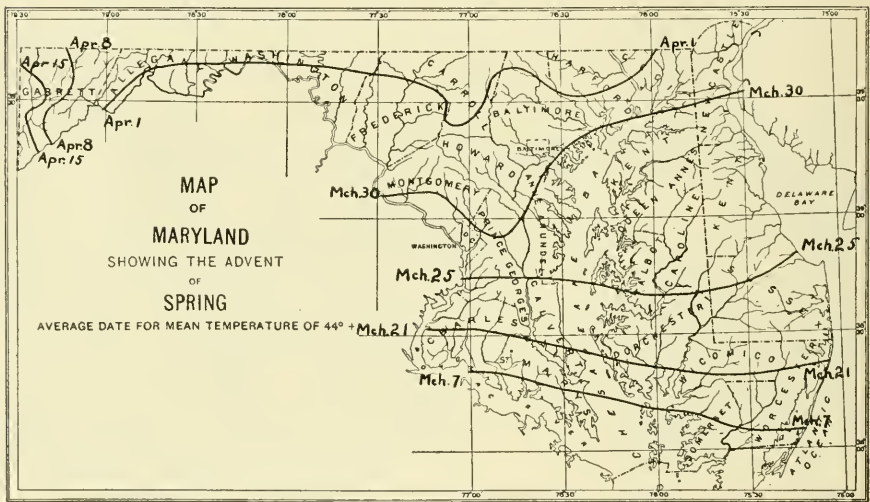


FIG. 32.—MAP SHOWING ADVENT OF SPRING.

Southern Maryland is 2° higher than that of Baltimore, while the temperature of the country to the north and west of the city decreases as the elevation of the land becomes greater. In the western part of the state the valleys are slightly warmer than the mountains, but are more liable to early frosts.

The precipitation of moisture in Maryland occurs in the form of rain, snow, and hail, usually the first, especially in the southern and eastern parts of the state. There are no distinctly wet and dry seasons, as in tropical countries, but careful observations show that there is more rain in

the spring and late summer than in the autumn and winter. There are also special areas where there is considerable rainfall, and others in which the precipitation is slight. The records show that the areas of greatest rainfall are in southwestern Garrett County, on the eastern slope of the Catoctin Mountain in the Frederick Valley, and along the shores of Chesapeake Bay south of Annapolis and near Cambridge; while the areas of least precipitation are between Denton and Westminster and in the mountainous counties. The annual precipitation in the state varies, according to localities, from 25 to 55 inches.

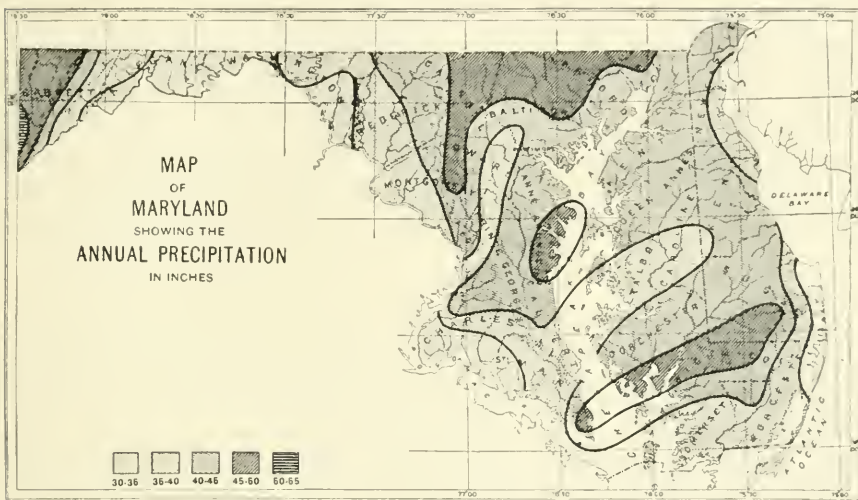


FIG. 33.—MAP SHOWING RAINFALL.

The winds in Maryland are prevailing from the west, but during the summer they usually come from the south, and in the winter from the northwest and west, especially in the eastern and central portions of the state. In the mountainous regions of Western Maryland the winds are more commonly from the northwest and west throughout the year.

THE FLORA AND FAUNA

The native plants of Maryland are not unlike those of Virginia and Pennsylvania, and the range within the state is wider than that between adjacent areas in neighboring states. The most prominent trees are oak,

hickory, pine, poplar, maple, locust, chestnut, cypress, red cedar, beech, and wild cherry. Among the wild fruit trees are the persimmon, the service berry, and Chickasaw plum. The various sorts of grapevine, the Virginia creeper, greenbrier, and morning glory are common climbers in the state, while the wild strawberry, blackberry, raspberry, blueberry, huckleberry, dewberry, and cranberry, all very abundant, represent the native small fruits. Besides these larger or fruit-bearing plants, there are countless others which carpet the ground in rapid succession from early spring until late autumn.

The animal life in Maryland is abundant, but does not show a great variety of the larger forms. Deer, black bears, and wildcats are sometimes taken in the wilder portions of the state. Usually, however, the mammals are represented only by such animals as ground-hogs, rabbits, skunks, weasels, minks, otters, opossums, and squirrels. Snakes are abundant, but most of the species are harmless. The copperhead and the rattlesnake are the most common venomous snakes, the former being the more vicious and dangerous.

The waters of Chesapeake Bay abound in shad, herring, menhaden, mackerel, crabs, terrapin, and oysters. Among the ducks which frequent Chesapeake Bay are the canvas-backs, red-heads, bald-pates, mallards, black-heads, and teal; while the land birds include the reed-bird, partridge, ruffed grouse (or "pheasant"), woodcock, snipe, plover, and Carolina rail. The "ducking shores" are visited by many hunters during the shooting season.

NATURAL RESOURCES

The leading natural resources of Maryland may be grouped under four heads: First, the mineral resources, including coal, building-stone, clay, etc.; second, the agricultural soils, embracing the many types of soil adapted to a great variety of crops; third, the forests with their lumber and other manufactured products; and fourth, the water products, taken from the sea, bays, and rivers of the state and affording a basis for the fishing and oyster industries. To these should also be added the water-power resources, which, although important, are less fully developed at the present time.

MINERAL RESOURCES

The mineral resources of Maryland are of much value and have yielded a great variety of products, some of which afford the basis for important commercial enterprise. The old crystalline rocks, confined for the most part to the Piedmont region between the Monocacy and the Chesapeake, have afforded the most varied mineral products. Here occur the most important building stones; the slates of Delta and Ijamsville; the granite of Port Deposit, Woodstock, Ellicott City, and Guilford; the gneiss of Baltimore; the marble of Cockeysville and Texas; the crystalline limestone of Westminster; the sandstone of Deer Creek; and the serpentine of Broad Creek and Bare Hills. In these oldest rocks occur also the ores of gold, copper, chrome, lead, and zinc. Iron ore is also found here, while all the flint, feldspar, kaolin, and mica in the state must be sought for in these rocks. These older rocks also appear in the Blue Ridge district bordering the Middletown Valley and have yielded traces of copper, antimony, and iron.

The rocks of later age, forming what geologists call the Paleozoic system, make up the western portion of the state. They furnish much sandstone and limestone suitable for building purposes, the latter also being burned extensively for agricultural purposes. There are also important deposits of cement rock that have afforded the basis for an extensive industry. At the top of the Paleozoic system of rock formations are situated the coal beds of the famous Cumberland-Georges Creek coal basin, including the wonderful "Big Vein" that is universally thought to furnish the highest quality of steam and smithing coal. These same rocks also contain important deposits of fireclay and iron ore, the former affording the basis for a very important firebrick industry.

The post-Paleozoic formations of the state, although not as rich in mineral products, are not devoid of deposits of economic value. The interesting variegated limestone breccia, known as Potomac marble, and the brown sandstone of Frederick and Montgomery counties belong to the oldest of these post-Paleozoic strata. The series of still unconsolidated beds, representing much of the remainder of post-Paleozoic time and

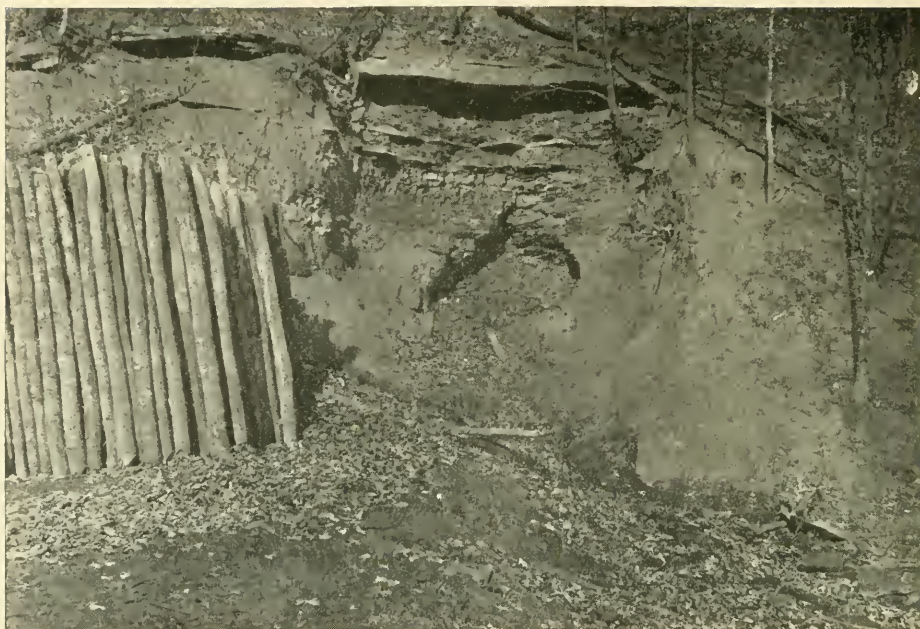


FIG. 34.—BEGINNING OF A MINE AT AN OUTCROP OF THE BIG VEIN NEAR LONACONING, ALLEGANY COUNTY.

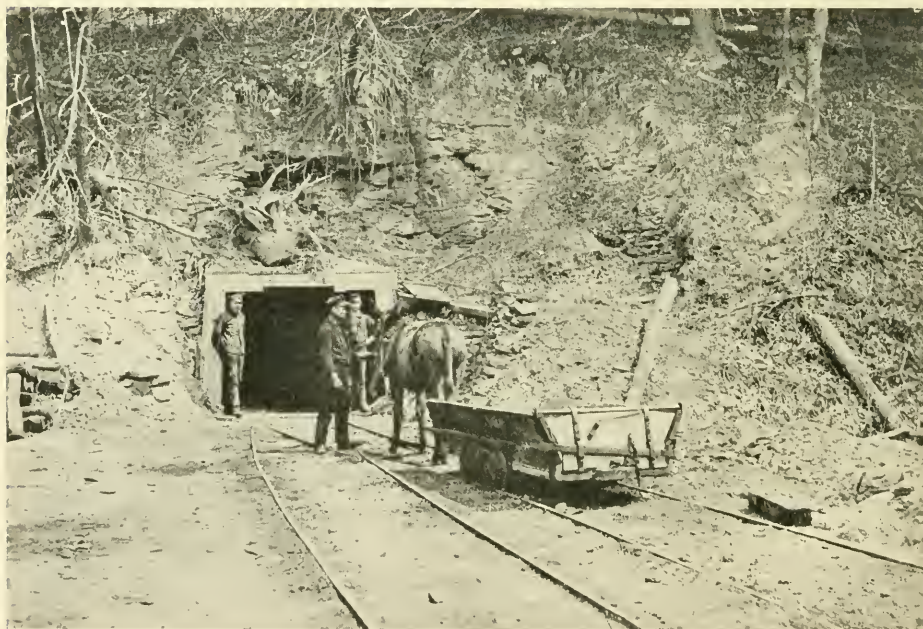


FIG. 35.—MAIN ENTRANCE TO BLUEBAUGH MINE, NEAR BARRELVILLE, ALLEGANY COUNTY.

comprising all of Eastern and Southern Maryland, and known as the Coastal Plain, furnishes the chief supply of brick, potter's and tile clay; of sand, marl, and diatomaceous earth (silica); and much of the iron ore. The clay industry, particularly, is one of the most important in the state. The total value of the mineral products in 1916 was \$14,737,773+.

COALS.—The coal deposits of Maryland are confined to western Alleghany and Garrett counties, and are a part of the great Appalachian coal field which extends from Pennsylvania southward into West Virginia. The Maryland coal is mainly semi-bituminous or steam coal, and in the Georges Creek basin, near Cumberland, contains the famous "Big Vein," or fourteen-foot bed, that for steam-producing and smithing purposes has no superior and few equals in any portion of the world. Both above and below the Big Vein are a number of smaller workable seams that contain coal of fine quality, which is already securing an extensive market. The Maryland coal was discovered in the eighteenth century and has been continuously worked since 1836, when the first company was organized. The aggregate output of Maryland steam and smithing coal at the present day amounts to several million tons annually.

The Maryland Big Vein coal occurs in the upper coal measures, while the most important of the small veins are in the lower coal measures. The latter have received less consideration in the past on account of the reputation of the Big Vein, but are destined to play a very important part in future coal development in Western Maryland.

The Maryland coal is high in fixed carbon, and, especially in the case of the Big Vein, low in sulphur and ash, thus possessing in highest measure those qualities which gave to coal its steam-producing power.

CLAYS.—The clays of Maryland are widely extended, occurring in a great number of the geological formations. They are most extensively developed through a belt running from northeast to southwest along the western margin of the Coastal Plain, and including both the Baltimore and Washington regions. Other important clays are found in the central and western sections of the state, and even the southern and eastern counties are not without this material in large quantities. The Maryland

clays are suitable for all grades of buildingbrick, tile, terracotta, firebrick, and some grades of pottery. Brickmaking began in Maryland in colonial days and has since been one of the most important industries in the state—the great brick works of Baltimore being among the largest of their kind. The manufacture of firebrick has been one of the most characteristic industries of Maryland for 50 years, and the brick made from the Carboniferous clays of Allegany and Garrett counties are regarded as the best in the country.

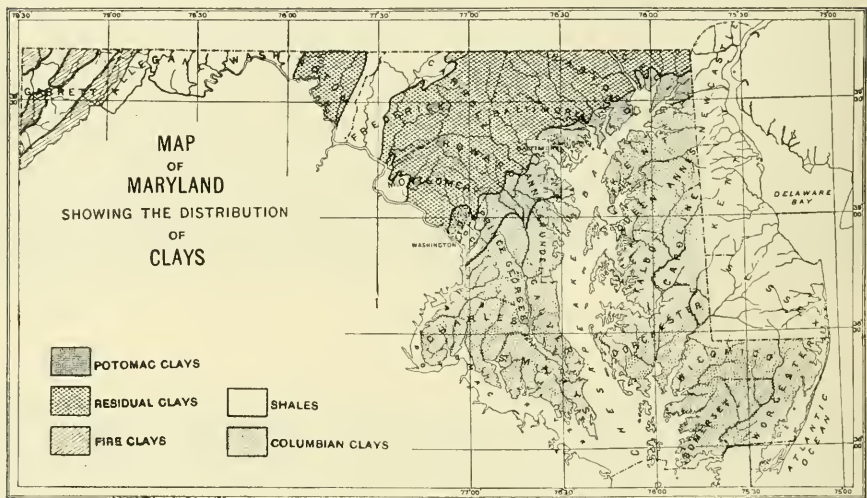


FIG. 36.—MAP SHOWING DISTRIBUTION OF THE CLAYS.

PORCELAIN MATERIALS.—The State of Maryland is well provided with porcelain materials, including flint, feldspar, and kaolin. The flint is widely distributed throughout the eastern portion of the Piedmont Plateau, and is especially abundant in Cecil, Harford, Baltimore, Carroll, and Montgomery counties. It occurs as vein fillings in the form of pure granulated or vitreous quartz. In Harford County, where the veins are most abundant, the quartz has been quarried in large amounts. It is crushed and then shipped in sacks to the potters.

Kaolin is produced mainly in Cecil County, which is part of the most important kaolin region in the United States, other deposits being found in the adjoining portions of Delaware and Pennsylvania. The kaolin has been worked extensively at several points, notably at Northeast, Cecil County, where large shipments of this material have been made annually. Considerable flint is extracted in the washing of the kaolin.



FIG. 37.—BEAVER DAM MARBLE QUARRY, COCKEYSVILLE, BALTIMORE COUNTY.

SANDS.—Sand deposits of economic value have been exploited both in the western and southern sections of the state, and the sandy sediment from the bed of the Potomac River and from other streams has also been dredged in large amounts. The Paleozoic formations of Western Maryland contain at two horizons important glass-sand deposits that have been mined extensively in nearby regions. The most extensively developed sand deposits in the state, however, are found in Anne Arundel County, where large excavations have been made in the Cretaceous deposits near

the head of the Severn River, and a good grade of glass sand obtained. The location of these sand deposits at tide renders it possible to ship the materials cheaply by water, and it is probable that they will be much more fully utilized in the future than they have been in the past.

Molding sand, suitable for brass castings, is found in the vicinity of Catonsville, Baltimore County, and this deposit is worked to some



FIG. 38.—GRANITE QUARRY AT PORT DEPOSIT.

extent at the present time. A sand is secured from the south shore of the Patapsco River below Baltimore for pig-iron casting.

Many sands are used for building purposes, the Cretaceous sands of Anne Arundel and Baltimore counties finding large employment in this way. Some of the residual sands of the Piedmont Plateau region are similarly used, especially that derived from the quartzschist.

MARLS.—The Tertiary formations of Eastern and Southern Maryland contain important marl deposits that have never been developed except for local uses. Their agricultural importance has not been generally

recognized, although they have been worked to some extent since the early decades of the century. The older Tertiary marls are glauconitic, and are not unlike the famous greensand marls of New Jersey, which have been so largely and successfully employed there as a natural fertilizer. Greensand marl contains a small percentage of phosphoric acid, some potash, and a greater or less amount of carbonate of lime. When spread upon the surface of the land the effect is slow, but is often more lasting than the commercial fertilizers. The younger Tertiary marls are mainly shell deposits, and are commonly known under the name of shellmarls. They frequently contain a large percentage of lime, and thus afford a valuable addition to certain soils.

DIATOMACEOUS EARTH.—Diatomaceous earth, known to the trade as silica or tripoli, has been produced in larger quantities in Maryland than anywhere else in the United States. It is confined to the middle Tertiary and consists of deposits of almost pure silica 30 to 40 feet in thickness. It is chiefly found in Calvert and Charles counties, where it has been more or less extensively worked at the mouth of Lyon's Creek on the Patuxent, and at Pope's Creek on the Potomac River. This remarkable deposit is composed of the microscopic shells of diatoms, and has found various uses in the trades.

IRON ORES.—The iron ore industry in Maryland was developed early in colonial days, and continued until a recent period to be one of the most important factors in the prosperity of the state. Numerous references to the iron ores and their manufacture into iron occur in the records of colonial times. The Principio Company, one of the largest of early commercial enterprises, controlled many furnaces and forges in Maryland and in Virginia, and both during the Revolutionary War and the War of 1812 furnished guns and projectiles to the army. These furnaces, as well as those in the western counties of the state, have long since been abandoned, with the exception of the Catoctin furnace in Frederick County, which has been in quite recent times in active operation. The only ores now being produced in Maryland to any extent are the carbonate ores derived from the clays along the western margin of the Coastal Plain,

chiefly in Anne Arundel and Prince George's counties, and the brown hematite ores of Frederick and Carroll counties. It is interesting to note that this carbonate ore was probably the first iron ore worked in Maryland, and is, even to-day, highly prized for its tensile strength.

MINERAL PAINTS.—Mineral paint has been produced at several points in Maryland. Large quantities were obtained in former years from the brown iron ore deposits of Frederick County. Ochre mines have also been operated in Carroll and Howard counties. The deposits of chief importance at the present time, however, are found associated with the clays in Anne Arundel and Prince George's counties. In the latter locality the material is a fine and highly ferruginous clay that can be easily worked, and large quantities have been mined annually. It occurs in many grades and colors.

BUILDING AND DECORATIVE STONES.—The building and decorative stones of Maryland are widely distributed throughout the western and central portions of the state, and consist of many different varieties which, from their diversity in color, hardness and structural peculiarities, are well adapted for nearly all architectural and decorative purposes. Among the most important may be mentioned granite, gneiss, marble, limestone, slate, sandstone, and serpentine. Among the localities in Maryland where *granite* has been most extensively worked are Port Deposit, in Cecil County; Woodstock, in Baltimore County; and Ellicott City and Guilford, in Howard County. Other areas in Cecil, Howard, and Montgomery counties contain some good stone, but it is quarried only for local use. At the localities first mentioned, the granite is extensively quarried at the present time, and has afforded material for the construction of some of the most important buildings in the country, including the Capitol and Congressional Library in Washington, Fortress Monroe, Forts Carroll and McHenry, the U. S. Naval Academy, and other public and private buildings, as well as bridges in Baltimore, Washington, and Philadelphia. The excellent quality of the stone renders it available in many cases as a decorative stone, and monumental work has already been undertaken.

The more solid varieties of the *gneiss* occurring in and near the city of Baltimore are extensively quarried for use as foundation stone. This rock is of a gray color, and occurs in parallel layers of light and dark stone, which at times are more or less sharply contrasted. Buildings constructed of gneiss, of which there are many in Baltimore, are agreeable in appearance. Among the more important structures built of this stone may be mentioned the Goucher College buildings in Baltimore.



FIG. 39.—MAP SHOWING DISTRIBUTION OF BUILDING STONES.

The *marble* of Maryland is mainly confined to the eastern division of the Piedmont Plateau. The white varieties occur for the most part in Baltimore County, and the highly variegated marbles in Carroll and Frederick counties. The white marbles of Baltimore County are found in a series of narrow belts a few miles to the north of Baltimore City. The most important of the areas is that which extends northward from Lake Roland to Cockeysville, and which is traversed by the Northern Central Railway. The marble has been extensively quarried both at Cockeysville and Texas, the well-known Beaver Dam marble quarries of the former locality having been in successful operation for more than 75 years. The

rock is a fine saccharoidal dolomite of great compactness and durability. Monoliths of large size can be obtained at the quarries. Many important structures in Baltimore, Washington, and Philadelphia have been made of this marble. Stone for the construction of the Washington Monument in Baltimore was taken from this locality as early as 1814.

The fine-grained, compact and variegated marbles, or crystalline limestones, of the western portion of the Piedmont Plateau in Carroll and Frederick counties compare favorably in their quality, texture, and beautiful veining with the well-known marbles from Vermont and Tennessee, and are deserving of much more attention than they have heretofore received. In the Wakefield Valley, west of Westminster, a beautifully mottled red and white marble occurs; others of black and white, gray and white, and blue and white veining occur near New Windsor and Union Bridge, and still others of a variegated yellow, with lighter veinings, have been derived from the same area. This marble, on account of the limited extent of the deposits, has not been regarded as of much economic importance, but the stone, when secured, is well adapted for purposes of interior decoration.

Another stone which may be classed with the decorative marbles is the "Potomac Marble," or "Calico Rock," of southern Frederick County. It has been used as a decorative stone in the old Hall of Representatives at Washington, where it forms a series of beautiful columns. It occurs, well exposed, at Washington Junction, Frederick County, and extends northward along the base of the Catoclin Mountain. The limestone fragments of which the rock is composed are imbedded in a red, ferruginous cement, and the stone, when polished, presents a very beautiful appearance.

The blue *limestones* of the Appalachian district have been used to some extent for building purposes, more especially in Hagerstown, where several structures have been made of this material. The blue limestone changes its color rapidly on weathering with a rather pleasing effect. A very compact, even-grained and pure cream-white stone occurs at one or two points in the Hagerstown Valley, but has not been exploited to any great extent as yet. The limestones are extensively used for foundation and other purposes.

The *slate* of northern Harford County is a part of the Peach Bottom slate belt that extends northward into Pennsylvania and southwestward into Baltimore and Carroll counties. The best slate in this belt is found not far from the Pennsylvania line in Harford County, the shipments, however, being largely made from Delta, Pennsylvania, and on this account the slate is often credited to Pennsylvania. The Peach Bottom slate has always enjoyed a very high reputation, and is second to none in its durable qualities. It has been worked since Revolutionary time.

The *sandstones* of different color which have been found at many localities in central and western Maryland are, many of them, well suited to furnish valuable building-stone, but only one or two localities have been commercially developed to any extent, although the stone is used locally at many points. The red sandstone of Triassic age in Frederick and Montgomery counties has long possessed a reputation in the building-stone trade. The most extensive quarries are situated on the Potomac River, near the mouth of Seneca Creek. The Seneca sandstone has been quarried in a more or less systematic way since 1774, and has always been highly regarded for its strength and durability and its deep red color. It has been used in the construction of many important buildings, including the Smithsonian Institution in Washington. The white Cambrian sandstone of the Catoctin and Blue Ridge mountains has been extensively utilized locally, and at times has found somewhat wider employment, especially by the railroad companies. In Allegany and Garrett counties the Silurian, Devonian, and Carboniferous sandstones have been quarried at several points, particularly in the vicinity of Cumberland, where two of these sandstone beds have furnished materials for steps, curbs, and architectural trimmings.

One of the most interesting and beautiful decorative stones in Maryland is the *serpentine*, which has been worked more or less extensively in Harford, Baltimore, and Cecil counties. The rock is very hard, and possesses a rich, emerald-green color, clouded with darker streaks of included magnetite. Maryland serpentine has been used for interior

decoration in several large buildings in New York, Philadelphia, Baltimore, and Washington, and has great possibilities as a decorative stone.

A number of the other Maryland stones have been used for building and decorative purposes. Among these may be mentioned the black *gabbro*, locally known as "Niggerhead Rock," which occurs widely throughout the eastern portion of the Piedmont Plateau. It is very hard and tough, and cannot be economically quarried and dressed, and on that account has not found very wide use. The various other stones employed for building purposes can be regarded as having little more than local value.

LIME AND CEMENT PRODUCTS.—The limestone and marble deposits of Maryland have been extensively burned for building and agricultural uses. There are many kilns used for supplying lime for local purposes scattered throughout the district in which the calcareous rocks appear.

The limestone and marble are also used as a flux for blast furnaces, the main supply being derived from the coarse-grained marble of Baltimore County, and the limestones of Washington County.

Hydraulic cement has been extensively manufactured from the magnesian limestone of western Washington and Allegany counties at Hancock, Cumberland, and Pinto, where extensive plants were long in operation. More recently the manufacture of Portland cement has been successfully undertaken and extensive plants have been established at Union Bridge, Carroll County, and Security, Washington County, more than a million barrels of cement now being produced annually. Much hydrated lime is also manufactured which is used both for agricultural and building purposes.

GOLD DEPOSITS.—The crystalline rocks of the Piedmont Plateau have been found to carry gold in Maryland, Virginia, North Carolina, and Georgia. The gold occurs in quartz veins, which occupy the old lines of fracture in the rocks. Gold was first discovered in Maryland in 1849 in Montgomery County. The first mine was opened in 1867, and some wonderfully rich specimens have been obtained, although the gold is so unevenly distributed that it has never been worked with profit. Gold has

been reported from other portions of the state, but these so-called finds are, when thoroughly sifted, found to be either entirely without foundation or the amount of gold so slight as to have no commercial value. The Montgomery County mines in 1890 produced between \$15,000 and \$20,000 worth of gold, but within the last few years the mines have been practically abandoned. A few hundred dollars worth of gold only is obtained annually.

ROAD MATERIALS.—Maryland is well provided with road-building materials of good quality. The trap rocks, which have shown themselves as the result of careful tests to be best adapted for this purpose, occur well scattered throughout the seven central counties of the state, and advantageously located for land and water transportation. The western counties, although without the trap rocks, are all provided with limestone, as well as siliceous deposits of value. Most of the counties of Southern Maryland, and the northern counties of the Eastern Shore, have iron-bearing gravels that can be employed with advantage for road-building purposes. The central and southern Eastern Shore counties have, in the absence of proper rock, a large supply of oyster shells, so that no section of the state is without road-building materials of some kind.

MINERAL WATERS.—The mineral waters of Maryland have attracted considerable attention, and several kinds are on the market at the present time. A few are represented as having medicinal properties, but the majority are sold principally as table waters, mostly in the City of Baltimore. Nearly all of the well-known waters come from the crystalline rocks of the Piedmont Plateau, a few only being reported from the Appalachian region and the Coastal Plain. Summer resorts have sprung up, as in the case of Chattolance and Buena Vista, about the more important of these springs.

MISCELLANEOUS PRODUCTS.—There are several other mineral substances in Maryland, which are either not being worked at all or only to a very limited extent at the present time, that have had a very interesting history. Among them may be mentioned copper, chrome, and soapstone.

Copper was worked in Maryland at a very early period in colonial times, and until the discovery of the great copper fields of the Lake Superior region was an important mineral product of the state. The abandoned mines in Baltimore, Carroll, and Frederick counties to-day indicate the importance of the industry at this earlier period. Maryland copper was used to cover the dome of the Capitol at Washington.

Chrome ore was discovered in 1827 in the serpentine of the Bare Hills in Baltimore County, and subsequently other deposits were found in Harford and Cecil counties. For many years Maryland supplied most of the chrome ore of the world, but the discovery in 1848 of the great deposits of chromite in Asia Minor caused the practical abandonment of the chrome mines of Maryland, although Baltimore is still one of the most important centers for the manufacture of chromium salts.

Soapstone has been worked to some extent in Carroll, Harford, and Montgomery counties, the most important occurrences being in Carroll County, where there is a small production of this material at the present time.

Among other mineral substances known to occur in Maryland, although not commercially profitable at the present time, may be mentioned lead, zinc, manganese, antimony, molybdenum, graphite, mica, and asbestos.

AGRICULTURAL SOILS AND CROPS

Maryland, with its great variety of soil and climatic conditions, offers exceptional advantages to the agriculturist. Within the borders of the state are lands admirably adapted to general farming, while the fine market and transportation facilities offer every inducement to those who wish to enter the field of specialized farming. Generally it is customary, in speaking of the different portions of the state, to refer to the Eastern Shore, Southern Maryland, Northern-Central Maryland, and Western Maryland. Each of these subdivisions is a distinct agricultural region and possesses certain peculiarities of soils, surface features, and climatic conditions, as well as different market and transportation facilities. The

total value of Maryland agricultural products in 1909 was \$43,920,149, while the live stock products brought the total to about \$60,000,000.

The EASTERN SHORE includes the counties that lie on the eastern side of Chesapeake Bay. The extremes of climate are tempered by proximity to the ocean and Bay, and the lands have proved their special adaptability to early fruits and vegetables, in addition to the staple crops of wheat, corn, oats, and hay.

In the northern part of the Eastern Shore are fine wheat and corn lands, the wheat lands being rich loams which overlies clay loam subsoils. They

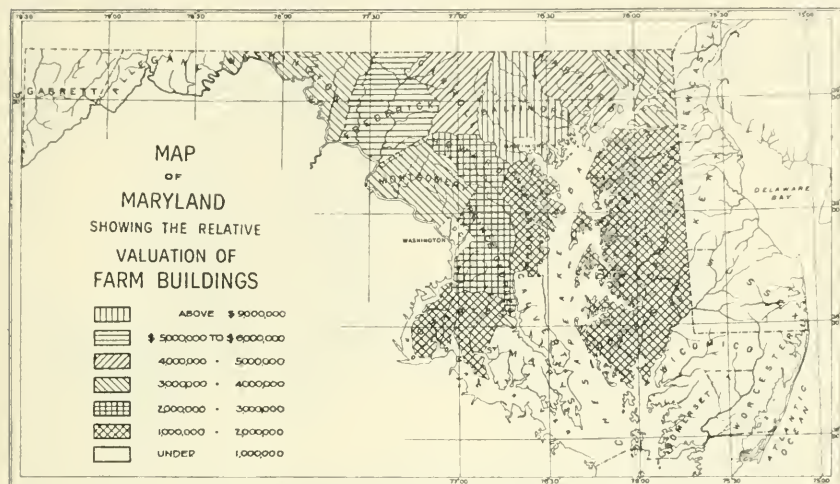


FIG. 40.—MAP SHOWING THE VALUATIONS OF FARM BUILDINGS.

are easy to cultivate, and can be made exceedingly productive. Soils of this character occupy large tracts of level upland in southern Cecil, Kent, Queen Anne's, and Talbot counties. These soils are of a rather yellowish red color, but there are other wheat lands with soils of a different character. In the lower counties, especially in portions of Dorchester, Caroline, Wicomico, and Worcester, are large areas of stiff clayey soil. Frequently these clays need underdrainage to make them produce well, as the subsoil is close and retentive.

There are also large areas of rich, sandy loams that are suited to growing vegetables and all kinds of small fruits, and consequently in many sections

the canning industry has been enormously developed. The excellent transportation facilities allow perishable fruit to be shipped to all of the larger northern cities where it finds a ready sale. In some sections farming in recent years has undergone a complete revolution, the old staple crops have been given up and the more lucrative truck and fruit crops introduced. The peach crop from the Eastern Shore is very large in good seasons. The industry is rapidly spreading into the lower counties. Pears have recently proved a great success in Kent County.

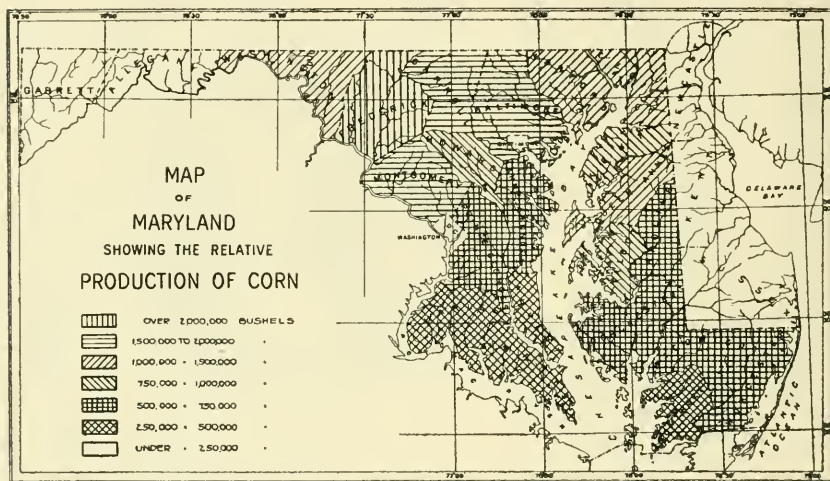


FIG. 41.—MAP SHOWING THE RELATIVE ANNUAL PRODUCTION OF CORN.

In connection with the soils of the Eastern Shore, some mention must be made of the large areas of tidal marsh lands. Thousands of acres of fertile land could be reclaimed at comparatively little expense, but as yet little or no attempt has been made in this direction. Lands that have been reclaimed are exceedingly fertile and will produce for an almost indefinite period.

SOUTHERN MARYLAND includes the lower counties of the state that lie on the western side of Chesapeake Bay. This land in general is higher and more broken than on the Eastern Shore.

The soils of Southern Maryland range in texture from gravelly loams to light clays. Generally speaking, they consist of loams and sands which are admirably adapted to growing all kinds of fruit and vegetables. The wheat lands are the heaviest types of soil found in Southern Maryland. They occur on the rolling uplands to a considerable extent, and as wide terraces along the Potomac and Patuxent rivers. These soils are heavy loams and clay loams, generally of a yellowish color. Some of these soils are still in excellent condition in spite of having been cultivated for

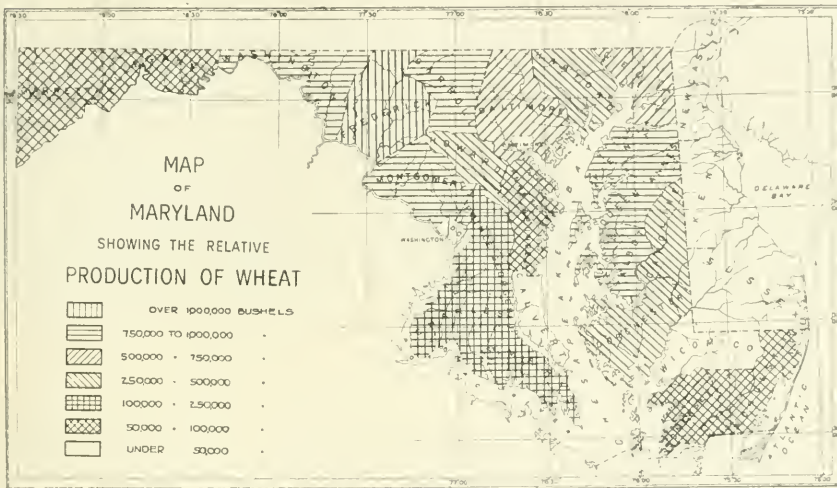


FIG. 42.—MAP SHOWING THE RELATIVE ANNUAL PRODUCTION OF WHEAT.

upwards of 200 years. On the uplands tobacco is grown as well as wheat. Wheat is grown on nearly all classes of soil in this portion of the state, but with very poor results on the lighter sandy loams. Lighter loams are found in some portions of the uplands and are better adapted to raising tobacco. The yield is less per acre but the quality is good. Maryland tobacco is exported chiefly to Holland, France, and Germany. It is a light, mild smoking tobacco, and formerly brought a much better price than at present. Competition with new tobacco-producing states and changing market demands have lowered the price and have correspond-

ingly decreased the profits. The tobacco lands have been allowed to run down, and those farmers who have turned their attention to other crops are gratified with the results obtained. The sandy loams cover large areas of Southern Maryland. There are loose sandy soils which are too light in texture for producing wheat or grass, but since the extensive truck industry has been developed the lands that are near markets have greatly advanced in value. The sandy river necks south of Baltimore are famous truck-growing areas and produce enormous quantities of melons, peas, beans, strawberries, and small fruits. Shipments are made principally by boat when the distance is too far for hauling by wagon. There is also a very large peach industry in this section of the state.

While certain portions of Southern Maryland have made great advancement along the lines of successful agriculture, there are still large areas of productive soil that are lying idle or growing up in pine forests. Lack of transportation facilities has had much to do with bringing about these conditions in certain sections, and the sparsely settled condition of some of the counties has also prevented the development which the fertile nature of the soils would seem to warrant. By introducing crops adapted to the character of the soil, and with adequate transportation facilities, this region should be made even more productive than it was formerly.

NORTHERN-CENTRAL MARYLAND.—The agricultural soils of this section of Maryland are mainly residual, that is, they are the products of the slow decomposition of the underlying rocks. They are, with few exceptions, strong and fertile. They can be made very productive and are generally in a high state of cultivation. The soils may be discussed under the following classes: The limestone-valley lands, the red lands, the gray lands, the phyllite soils, and the barren lands of the serpentine areas.

The limestone-valley lands are perhaps the strongest soils found in the region. They are identical in many respects with the soils of the Hagerstown Valley. These soils are heavy red and yellow loams and clays. The largest valleys of these rich soils are found in Frederick, Baltimore, Carroll, and Howard counties. These soils by careful cultivation annually yield fine crops of grass, wheat, corn, and other cereals. Many



FIG. 43.—KENT COUNTY FARM LANDS OF THE TALBOT TERRACE PLAIN.



FIG. 44.—HARVESTING WHEAT IN KENT COUNTY.



FIG. 45.—FARMING LANDS NEAR LEONARDTOWN, ST. MARY'S COUNTY.



FIG. 46.—TOBACCO FIELD IN CHARLES COUNTY.

of these valleys have long been noted for their prosperous, well-managed farms. On account of their heavy, clayey nature they are famous grass lands, and large numbers of cattle are fattened in these valleys. The proximity to Baltimore and the excellent transportation facilities have also greatly stimulated the dairy interests.

The red lands may be divided into two subclasses. First may be described the red lands of Carroll and Frederick counties, which consist of red loams and clay loams. These soils occupy areas near the fertile

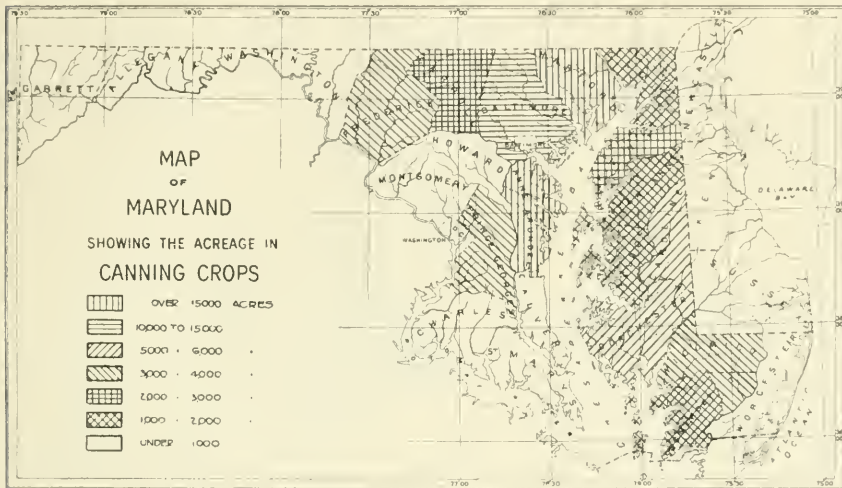


FIG. 47.—MAP SHOWING THE ACREAGE IN CANNING CROPS.

Monocacy limestone valley, and the difference between the soils of the two regions can be easily compared. In good seasons the red lands are almost as productive as the fertile limestone soils, but during years when the conditions for growth are unfavorable the yields are not so high as from the heavy, clayey soils of the limestone valleys. However, the red lands rank as good, strong soils, and generally produce excellent crops of grass, wheat, corn, oats, and potatoes, the principal crops grown in this section of the state.

The second class of red-land soils occupies areas in Cecil, Harford, and Baltimore counties. The soils are heavy red loams, grading into stiff

clay loams of a reddish or yellowish color. These are likewise strong clay soils, naturally productive and capable of standing considerable hard usage. They produce good yields of the staple crops, such as wheat, grass, and corn. In addition they produce large yields of tomatoes and corn for canning purposes. The canning of corn, tomatoes, and other vegetables has been extensively carried on in Harford and Cecil counties for many years, and is one of the leading industries of these counties. The dairy interests are considerable on these strong soils, which produce excellent crops of hay and afford fine pasturage.

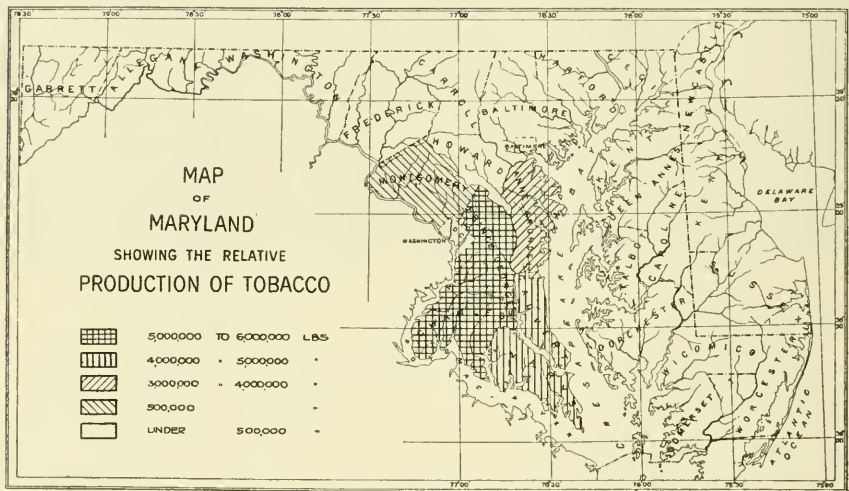


FIG. 48.—MAP SHOWING THE RELATIVE ANNUAL PRODUCTION OF TOBACCO.

The gray lands and the corn and wheat lands, derived from deposits of phyllite, are so nearly alike in many respects that they may be discussed together. These soils occupy large areas in Frederick, Carroll, Montgomery, Howard, Baltimore, Harford, and Cecil counties. The surface of the country away from the larger streams is gently rolling, but becomes hilly and broken along the principal streams. The surface drainage is good in the entire region. The soils are grayish-yellow loams which grade into yellowish clay loams. They are naturally productive, but on account of their rather light texture they must be farmed carefully or they become

exhausted. They are excellent corn and wheat soils and are classed as good general farming lands. In Cecil and Harford counties they produce fine crops of late tomatoes for canning purposes. In Montgomery County they were formerly used to a considerable extent for growing tobacco. They are good grazing lands, and near Washington and Baltimore the dairy business is extensively carried on. In the neighborhood of these cities market gardening is also an important industry. The lighter loams, especially, yield fine crops of all kinds of vegetables, and the nearness to market allows the farmer to haul his produce directly to the consumer. Transportation facilities are also good.

WESTERN MARYLAND is divided into three well-marked districts from an agricultural point of view.

The eastern district includes the broad Hagerstown Valley and the Middletown and other smaller valleys, together with the mountain slopes adjoining. The Hagerstown Valley has a width of about 20 miles and contains a large number of excellent farms. The soils are red or yellow clay loams or clays derived from the weathering of the thick beds of limestone that occur there. These soils, by careful cultivation, produce large crops of wheat, corn, and grass. Thirty-five bushels of wheat per acre is not an uncommon yield, and from 50 to 100 bushels of corn can be raised. The railroad facilities are good in the valley, and Hagerstown, a prosperous manufacturing city, is situated in the center of the region. In addition to the large production of wheat and corn many cattle are annually fattened here.

Along the eastern margin of this valley is the center of the famous mountain peach industry. So excellent are the shipping facilities that peaches picked in the late afternoon are on sale in the New York market the next morning.

The smaller valleys, of which the Middletown Valley is the most important, contain good soils, mostly heavy loams and clays well adapted to raising corn, wheat, and grass, which are the principal crops grown.

The central district is rough and mountainous, and the greater portion is thickly wooded and not well adapted to farming purposes. The soils of

the mountain ridges are thin and stony and difficult to cultivate. There are, however, some valleys in this region that possess limestone soils that are fertile and can be made quite productive. The largest of these valleys



FIG. 49.—TYPE OF BARN IN CARROLL COUNTY.



FIG. 50.—CATTLE RAISING AND DAIRYING IN CARROLL COUNTY.

lies 12 miles east of Cumberland, and the strong clay soils produce good crops of wheat and timothy hay. Other valleys of this region possess shale soils which can be made productive, and there are also large areas of hill pasture land which contain shale soils. Along the Potomac River and

some of the larger creeks, especially near Cumberland, there are large tracts of alluvial bottomlands which annually make good yields of the staple crops. Fruit growing has lately been introduced in the hilly region east of Cumberland, and there are already many large and profitable peach orchards. Oats, buckwheat, wheat, rye, and potatoes are the main crops grown in this part of the state.

The western district comprises the Alleghany Plateau. The soils may be classed as the red sandstone and shale soils, the yellow sandstone soils, the

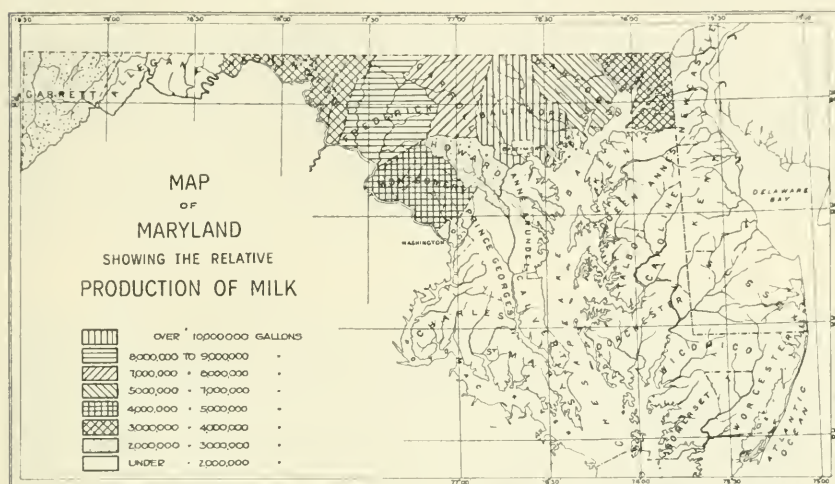


FIG. 51.—MAP SHOWING THE RELATIVE ANNUAL PRODUCTION OF MILK.

rough, stony soils of the mountain ridges and the “glades” or mountain swamp lands.

The red sandstone soils occupy large areas in the central portion of Garrett County, and the yield of crops produced on these soils compares favorably with the best class of soils found in the entire state. The soil is a heavy red loam that grades into red clay loams. These soils occupy rolling valley lands and produce good crops of wheat, corn, oats, and buckwheat. The Cove country, as it is called in northwest Garrett County, has long been noted as a fine farming section, and there are still large areas of these fine soils which can be made fully as productive and prosperous as the section just mentioned.

The yellow sandstone soils comprise the greater portion of Garrett County and the Georges Creek Valley in Allegany County, and may be classed as heavy sandy loams. They produce good yields of buckwheat, wheat, oats, hay, and corn. In the native forest the sugar maple abounds, and a large income is derived from the sale of maple sugar each spring. These lands are also good pasture lands in addition to being well adapted to apple orchards.

The stony mountain soils include the shallow soils found along the crests and sides of the principal mountain ridges of this region. The soils

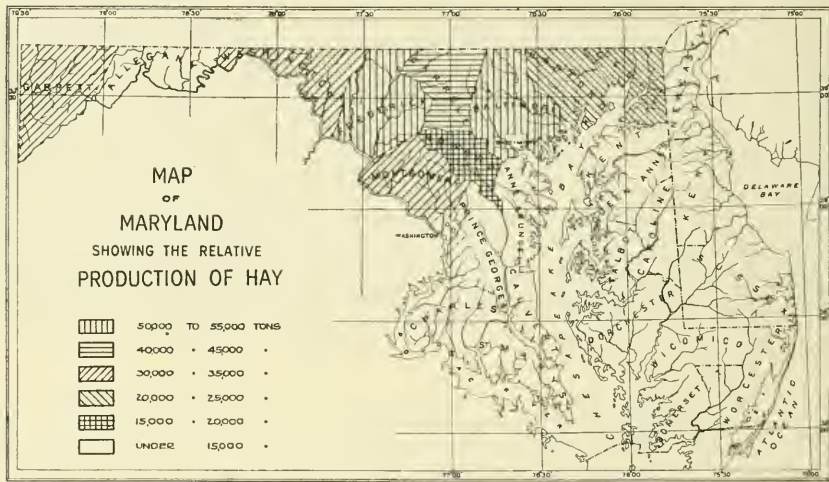


FIG. 52.—MAP SHOWING THE RELATIVE ANNUAL PRODUCTION OF HAY.

are thin, difficult to till, and not adapted to general farming purposes. They are extensively cleared, and are covered in many places with valuable tracts of merchantable timber, especially chestnut.

The "glades" are large swampy tracts of land which occur principally in the central portion of the county. Formerly the glades were famous cattle pastures during the dry seasons, but now large tracts of glade lands have been thoroughly drained and the soils, rich in decayed organic matter, produce good crops of oats, timothy, and even corn and wheat.

In conclusion it may be said that Maryland has a great variety of soils which are adapted to almost any crops that will grow in this section of



FIG. 53.—FARMING AND ORCHARD LAND, ALLEGANY COUNTY.



FIG. 54.—SUGAR-MAPLE GROVE NEAR BITTINGER, GARRETT COUNTY.

the United States. The greater portion of the arable land of the state is under cultivation and farmed at a fair profit, but there are extensive areas, especially in western and southern Maryland, where there is room for great agricultural development.

FORESTS

The forests of Maryland constitute a resource whose value is very great even to-day, when many years of cutting and often improvident use have



FIG. 55.—SAPLINGS OF LOBLOLLY PINE, ST. MARY'S COUNTY.

together reduced both area and quality of the original stand. Their value not only may be estimated as a commercial asset, but in other less apparent ways in which the forest plays a most important part. The uses of water power are multiplying with the development and increase of great manufacturing industries, and with this there is manifest a resultant demand for power which is both constant and cheap; good agriculture is admittedly a prime necessity for real prosperity in any country, state, or district, and

as a cover of forest is a necessity for the power from streams so is a reasonable percentage of wooded land much to be desired where agriculture is to be permanently successful.



FIG. 56.—HEMLOCK FOREST, SIDELING CREEK,
WASHINGTON COUNTY.

Maryland has at present 35 per cent of its land area in forest growth, with a stand of timber estimated at 3,829,776,000 board feet and possessing a value of \$17,142,112. Once this percentage must have been

95 or even more. Of this timber stand 2,500,747,000 feet are hardwood and 1,328,029 feet are pine.

During the year 1914 the total value of the timber cut in Maryland amounted to \$6,494,191, the cost of production being much the largest part.

WATER PRODUCTS

Chesapeake Bay and its tributaries, occupying less than one-quarter of the entire area of Maryland, supply to the people each year products of great value. Throughout the country this magnificent body of water is renowned for its oysters, crabs, terrapin, and shad, yet few even among the inhabitants along its shores realize the great wealth contained in its waters. The average value of the annual output is about \$5,000,000.

THE OYSTER INDUSTRY.—The brackish and salt waters of Chesapeake Bay have long been known as the favorite home of the oyster. At the present time the "natural bars" occupy large areas on either side of the main channel of the Bay and about the mouths of the numerous rivers. The total area of natural oyster bars exclusive of the Potomac River is 215,968 acres, while the area of barren bottoms suitable for oyster culture in the same area is 100,800 acres. The most important oyster bottoms are along the shores of Dorchester, Somerset, Talbot, Queen Anne's, Kent, Anne Arundel, Calvert, and St. Mary's counties. If, however, the advantages afforded by the Bay were utilized by a proper system of oyster cultivation there is scarcely a foot of the bottom of the 2000 square miles covered by its shallow waters where oysters could not be reared, and it may be safely asserted that the annual product might reach the colossal amount of 100,000,000 bushels a year. The output of to-day, though insignificant when compared with what it might be, reaches 6,000,000 to 8,000,000 bushels a year, with a value of \$3,000,000 to \$4,000,000. In 1884, the banner year of Maryland oyster production, the yield was 15,000,000 bushels. The oysters obtained, besides supplying the local demands, support the important packing and canning trade of Baltimore, Crisfield, St. Michaels, Oxford, Cambridge, and Annapolis, whose products reach almost every inland town in the country. On the ocean front in the bays bordering Worcester County the oyster industry is rapidly developing.



FIG. 57.—A BOAT-LOAD OF OYSTERS, SOMERSET COUNTY.



FIG. 58.—A FISH HATCHERY.

THE SHAD INDUSTRY.—The Fish Commission empty into Chesapeake Bay and its tributaries each year many million young fish to support the shad fisheries of the state, which depend upon the return of the adult shad in the spring of the year. The principal shad region of the Bay shore lies north of Swan Point, between it and the lower stretches of the Susquehanna. The principal landing points for the Bay shore fisheries are Havre de Grace, Northeast, Charlestown, Betterton, and Rock Hall. Large numbers are also caught in the Potomac River, the Pocomoke and



FIG. 59.—AN OYSTER AND CRAB-PACKING PLANT.

Tangier sounds, and in the Choptank, Chester, and Patuxent rivers. The season begins about the first of April and extends to the last of May or the first of June. The largest catches are usually in April. The annual value of the catch is about \$250,000.

THE MENHADEN INDUSTRY.—This fish is by far the most abundant fish along the Atlantic coast of the United States and in many ways one of the most important, but since it is not usually regarded as edible it is little known outside of the fishery and fertilizing industries. The menhaden is a small fish seldom weighing a pound and close related to the herring and the shad. It usually makes its appearance in Chesapeake

Bay early in the spring and rapidly becomes more and more abundant, crowding into the sounds and inlets until the water is fairly alive with



FIG. 60.—SHUCKING OYSTERS.



FIG. 61.—ICING OYSTERS.

them. They remain as long as the weather is warm, but as the winter approaches they pass out into the ocean, so that few are found in Chesapeake Bay after November. They are of great commercial impor-

tance from the fact that a valuable oil can be extracted from their bodies by pressure, while the solid residue is an important constituent of manufactured fertilizers. Small catches of the menhaden are made at various points along the shores of Chesapeake Bay, especially in the southern part, but the main industry is at present limited to the Potomac River, which yields more of these small fish than any other river along the eastern Atlantic coast. The total value of the catch in Maryland does not exceed \$50,000 annually.

MISCELLANEOUS FISH.—Many other varieties of edible fish are secured from Chesapeake Bay. They reach the markets of the larger cities and towns of the region and some are shipped to distant points. The most highly prized edible fish is the Bay or Spanish Mackerel, which has its chief feeding ground in Chesapeake Bay. Among other important fish are Blue Fish, Trout, White Perch, Yellow Perch, Rock, Herring, Flounders, Sturgeon, Pike, and Pickerel. The total annual catch has a value of about \$500,000.

THE CRAB INDUSTRY.—During the season, from April to October, the shallower waters of the shores and estuaries of Chesapeake Bay, as well as the waters on the ocean side, contain an indescribable number of crabs. This abundance causes a fierce competition for food so that the crabs are always hungry and ready to seize any sort of animal bait. The number of hard-shell crabs captured in a day is astonishing, a single fisherman sometimes catching 2000 between sunrise and ten in the morning. At the principal crab-canning centers of Oxford, Cambridge, and Crisfield a large part of the catch is picked and canned, yielding great quantities of crab meat annually. The crabs, during the few hours when their shells are soft, take no food and hide themselves in the sand or grass, so that soft-shell crabs are much less abundant and bring a higher price than the hard-shell. Moreover, when the crab is soft it is very delicate and easily killed, and is thus transported alive with difficulty. The irregularities in the daily catch which might arise under these adverse circumstances are avoided by the use of "shedding pens," which hold the "shedders" until they are soft. The total annual value of the crabs caught in Maryland is in excess of \$300,000.

TERRAPIN.—The oyster and the crab suggest the terrapin as a third characteristic product of the shores of the Chesapeake. This expensive little tortoise ranges from New England to Texas, but is most abundant in the marshy lands from the Chesapeake southward. The terrapin is most easily caught in the summer when the demand is slight, so that the catch is “farmed” in pens and fed with crabs and fish until the winter, when as a delicacy the terrapin may bring as much as \$75 per dozen.

CLAMS.—During the season, from May until September, the estuaries and bays of Somerset County afford clams in great abundance, especially from Tangier and Pocomoke sounds.

MANUFACTURES

The manufactures of the state, according to the census of 1910, amounted to \$315,669,000, making Maryland the fifteenth state in the Union in the value of her manufactured products. The state has gradually lost its relative position, being seventh among the states in 1849, but has greatly increased its per capita production during that period. It was \$57 in 1849 and \$244 in 1909. Its proportion of the total value of manufactures of the country declined from 3.2 per cent in 1849 to 1.5 per cent in 1909.

CLOTHING.—The most important manufactured product is clothing, especially men's clothing, in which Maryland ranks fourth among the states. The greater part of this manufacture is carried on in Baltimore City.

COPPER, TIN, AND SHEET IRON PRODUCTION.—The second most important group of manufactured products is enumerated under this head, with an increase of 82.5 per cent in five years, due largely to the increased production of stamped and enameled ware.

CANNING AND PRESERVING.—Maryland has always been one of the chief centers for the canning and preserving industry, fruits, vegetables, fish, and oysters being the chief products. Many large establishments are found in Baltimore, while others are scattered throughout the central and eastern portions of the state near the source of supply.

SLAUGHTERING AND MEAT PACKING.—There has been a constant increase in the production of the slaughtering and meat-packing establishments of Maryland, until to-day it is one of the most important industries of the state.

LUMBER AND TIMBER PRODUCTS.—There are more establishments engaged in this industry than any other in the state, the produce consist-



FIG. 62.—THE INTERIOR OF A BALTIMORE POTTERY.

ing of lumber, shingles, cooperage materials, doors, sash, blinds, interior finish, and packing boxes. Many of these industries are in the counties near the source of timber supply, while others, especially those engaged in the manufacture of finished products, are located in Baltimore.

FOUNDRY AND MACHINE-SHOP PRODUCTS.—Maryland produces a great diversity of foundry and machine-shop products for some of which it has a wide reputation. Most of these establishments are located in Baltimore.

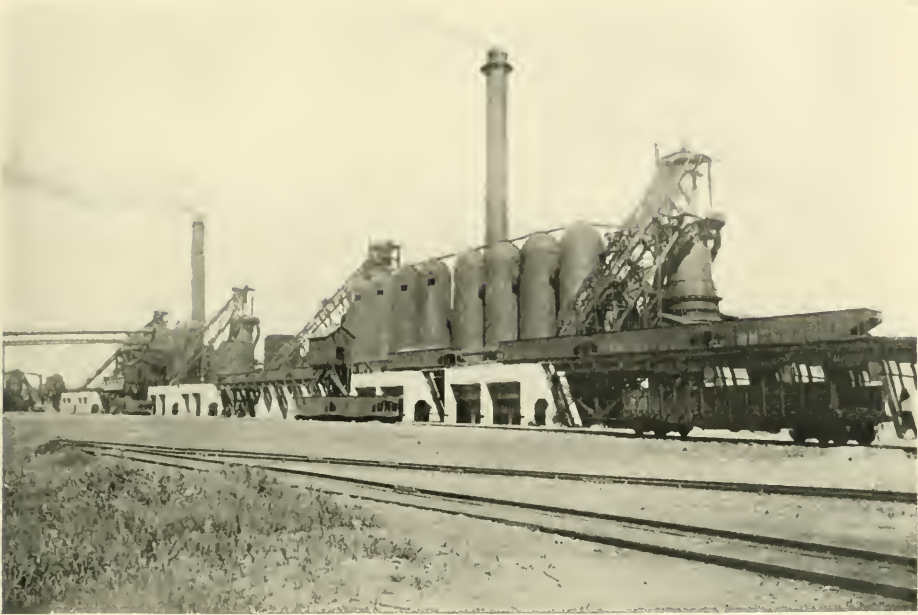


FIG. 63.—A BLAST FURNACE OF THE BETHLEHEM STEEL COMPANY, SPARROWS POINT.



FIG. 64.—ORE DOCKS AT SPARROWS POINT.

TOBACCO MANUFACTURE.—The City of Baltimore has always been an important center for tobacco manufacture, including chewing and smoking tobacco and snuff, as well as cigars and cigarettes.

FERTILIZERS.—The manufacture of fertilizers has been one of the characteristic industries of Maryland, the inception of the industry dating from about 1832, when the demand arose for a fertilizer in connection with tobacco culture. In 1879 Maryland was the leading state in the Union in



FIG. 65.—DELIVERING SWEET CORN AT CANNERY, EASTON, TALBOT COUNTY.

the manufacture of commercial fertilizers and it to-day ranks second in that respect. Most of the establishments are located in Baltimore or its vicinity, although there are several in other portions of the state.

IRON AND STEEL.—The manufacture of iron and steel, especially steel rails and plates for vessels, has increased greatly in importance in the last two decades, the chief industry being the Maryland branch of the Bethlehem Steel Company at Sparrows Point on the Patapsco River below Baltimore.

CITIES AND TOWNS

The State of Maryland has only four cities of more than 10,000 inhabitants, Baltimore with a population of 558,485 being the only great city. There are only 13 cities and towns which exceed 3000 in population, which shows that the occupation of the people of the counties is chiefly confined to agriculture, although the fishing and oyster industries of the Chesapeake Bay region and the mining and quarrying operations of the western and central counties likewise support a large scattered population. These



FIG. 66.—VIEW OF BALTIMORE HARBOR AND SKY-LINE.

towns and cities with a population of more than 3000, according to the U. S. Census of 1910, are the following:

BALTIMORE, with a population of 558,485, is the most important city of the state. It is situated at the head of navigation, on the Patapsco River, about 13 miles from Chesapeake Bay and 170 miles from the Atlantic Ocean at Cape Henry. Baltimore offers many advantages as a commercial center in its natural location, in its peculiar economic conditions, and in the liberal policy of its municipal administration. Its

geographic situation is most advantageous for land and water transportation, direct lines of communication by rail connecting it with the great agricultural and mining regions of the south and west, while numerous



FIG. 67.—THE LOWER HARBOR FROM HISTORIC FORT McHENRY.



FIG. 68.—LIGHT STREET WHARVES AT THE HEAD OF BALTIMORE'S HARBOR.

lines of steamboats have developed a most important coastwise and foreign trade.

Baltimore, named after the then Proprietor of Maryland, Lord Baltimore, was laid out in 1729 on a tract of 60 acres, which cost only \$600. Its

rapid growth in population and commercial importance has been due to the many favorable conditions before cited. The principal industries are ready-made clothing, oystercanning and fruitpacking, shirts and overalls, fertilizers, straw goods, cotton duck, iron and copper, tobacco, drugs and medicines, clay products, shipbuilding, marble and stone work, lumber, and furniture making.



FIG. 69.—VIEW OF CUMBERLAND AND THE "NARROWS" OF WILLS MOUNTAIN.

Baltimore is renowned for its beautiful parks, places and public buildings, and on account of the many monuments in its public squares has been termed "The Monumental City." Druid Hill Park and Mount Vernon Place are famed for their beauty. Washington Monument, in the center of the latter, was the first of the public monuments to be erected to the Father of his Country. Baltimore is also the seat of the famous Johns Hopkins University and many other similar educational institutions.

CUMBERLAND, named after old Fort Cumberland of colonial days, is the second city in importance, with a population of 21,839. It is situated

in Allegany County, on the upper waters of the Potomac River and on the direct line of communication with the west. The situation of this city is exceptionally favorable for manufacturing purposes on account of its location in the midst of rich resources in steam coals and lumber. It has many important industrial establishments. In the immediate neighborhood are materials suitable for the manufacture of glass, hydraulic cement, and high-grade building and firebricks. Next to Baltimore it is the most important railroad center in the state, being reached by the Baltimore and Ohio, Pennsylvania, and Western Maryland railroads.

HAGERSTOWN, named for Jonathan Hager, its founder, is the third city in size, with a population of 16,507. It is located in the center of the fertile Cumberland Valley and is one of the most enterprising towns of the state. It is the distributing point for a rich farming country and is also a prominent industrial center. The most noted of its manufactures are bicycles, silk, knit goods, shirts, brick, furniture, and carriage stock. Several railroads center at Hagerstown so that excellent transportation facilities are provided.

FREDERICK, named for the last Proprietor, Frederick, sixth Lord Baltimore, is the fourth city in size, with a population of 10,411. It is, like Hagerstown, the center of an important agricultural region and likewise has numerous industries, among them tanneries, foundries, sash factories, brick works, and knitting mills.

ANNAPOLIS, the capital of the state since 1694, when it was changed from St. Mary's City, is the fifth city in size, with a population of 8609. It is the oldest city in the state and was settled in 1649 under the name of Providence, afterward changed to Anne Arundeltown. In 1708 it received its name of Annapolis under a charter granted by the English queen. It is the seat of the United States Naval Academy, established in 1845, and of St. John's College, which was chartered in 1789. The State House is one of the most interesting buildings of the colonial period. Many private houses of the same period are still standing and are among the most beautiful structures of their kind in existence. The Continental Congress held its sessions here for a period and in the old Senate Chamber



FIG. 70.—VIEW OF ANNAPOLIS SHOWING THE NAVAL ACADEMY.



FIG. 71.—VIEW OF FROSTBURG.

of the State House Washington resigned, on December 22, 1783, his commission as Commander-in-Chief of the Continental Army. The chief industry is oyster-packing. The city is provided with excellent rail and steamboat communication.

SALISBURY, with a population of 6690, is the largest town on the Eastern Shore. It is an important business center and contains a variety of industries, the most important interests centering in lumbering.

CAMBRIDGE, with a population of 6407, is in the midst of a fertile farming country on the Eastern Shore and is an important shipping point for vegetables and fruits. It has a fine harbor and its shipping facilities, both by land and water, are excellent. The chief industries are oysterpacking and canning.

FROSTBURG, with a population of 6280, is situated in western Allegany County at an elevation of 2000 feet above tide. It is in the center of the coalmining district of the Georges Creek Valley and its interests largely center in that industry.

HAVRE DE GRACE, with a population of 4212, is beautifully located at the mouth of the Susquehanna River. It is an important manufacturing and fishing center, its chief industries being canneries, flour and lumber mills, sash factories, and textile works.

BRUNSWICK, located on the Potomac River in Frederick County, with a population of 3721, is an important and rapidly growing railroad town containing large freight yards and repair shops of the Baltimore and Ohio Railroad. There are also several manufacturing establishments.

CRISFIELD, situated on the eastern shore of Chesapeake Bay near the Virginia line, with a population of 3468, is reached both by boat and rail. It is an important oyster and crab center, extensive shipments of both fresh and canned products being made from this point to all parts of the country.

WESTMINSTER, with a population of 3295, is an important distributing center for a rich farming district. The chief industries are flour mills and factories, the latter chiefly engaged in the manufacture of carriages and cigars. Western Maryland College, under the control of the Methodist Protestant Church, is situated here.

EASTON, with a population of 3083, is situated on the Choptank River, and has both water and rail communications. The town is the trading center for the surrounding grain and fruit country, its chief industries being mills, canning establishments, furniture, and shirt factories.

SUGGESTIONS FOR PHYSIOGRAPHIC AND GEOLOGIC EXCURSIONS

The great variety exhibited by the State of Maryland in its physiography and geology, and in the products of its mines and quarries, farms, and manufacturing plants renders it possible to see easily from each of the leading centers many of the interesting features of the state. A few suggestions for physiographic and geologic excursions are given in the following paragraphs.

BALTIMORE AND VICINITY

The City of Baltimore is so situated as to display in its eastern and southern sections and the areas adjacent thereto many of the characteristic features of the Coastal Plain, while in the northern and western parts of the city and in the surrounding country the characteristics of the Piedmont Plateau are shown. In the lower portions of the city, from Baltimore Street southward to Long Bridge, the city is built on the Talbot terrace (latest Pleistocene), the gravels and loams of this terrace overlying the clays of the Potomac group (Lower Cretaceous), while on Charles Street from Lexington Street north and throughout a wide area in the center of the city the Wicomico terrace (middle Pleistocene), much cut by streams which often reach the underlying Potomac clays and sands, forms the surface. Farther north and west at the level of Eutaw Place and portions of Druid Hill Park the Sunderland terrace (early Pleistocene), much dissected, caps the summits. On the highest levels around the northern and western sections of the city, the highlands contain remnants of the Brandywine (Pliocene) terrace, the underlying crystalline rocks, however, often appearing at the surface. The underlying Potomac clays and the ancient rocks of gneiss or gabbro outcrop at the higher levels, along

the slopes of the hills and in the stream valleys (gneiss at Jones Falls; gabbro at Gwynns Falls above Calverton). In the upland areas the rocks are often disintegrated to considerable depths, producing a cover of residual materials. Many interesting minerals may be found in the quarries opened along the stream channels or in railroad cuts, among the more common being quartz, feldspar, pyroxene, hornblende, etc.

If wider areas are visited fine exposures of Potomac clays may be found on the southern shore of the Patapsco River (Hawkins Point), while at White Rocks and Rocky Creek nearby are younger Cretaceous sandstones of the Raritan formation. To the north of the city in many of the valleys crystalline limestone or marble may be seen (Texas, Limekiln Valley, and Green Spring Valley), the limestone forming the valley floors while harder quartzite or mica schist form the surrounding hills. The green serpentine, an ancient eruptive rock now much altered, of the Bare Hills region, is a special geologic feature of much interest. The streams about Baltimore have had a varied history and may be separated into two types, those flowing with rapid currents over a floor of crystalline rock, and the more sluggish, often tidal, streams whose beds are in the Cretaceous or later deposits. The line separating the two, which crosses the state from northeast to southwest, is known as the "fall line" (well shown at Relay, and Raspeburg) and represents the point where the streams flowing with rapid currents over the crystalline rocks reach the unconsolidated sediments of the Coastal Plain. The tidal streams represent part of the submergence which formed Chesapeake Bay and its many estuaries, and which has made possible the unparalleled water transportation of the state.

CENTRAL MARYLAND

This district corresponds in a general way with the Piedmont Plateau and affords a great variety of crystalline rocks, for the most part highly altered from their original constitution with the obliteration of many of their former characteristic structures, and with new ones developed which are characteristic of rocks of this type over a wide area of the Piedmont belt in adjoining states. Into these ancient metamorphosed crystallines

have been injected molten rocks which to-day appear as pegmatite and diabase dikes. The texture of the rocks, as a result of recrystallization under great pressure, presents a characteristic foliation often much contorted. This may be widely seen in the more schistose rocks. Even the eruptives have frequently developed a similar schistosity. The rocks have been extensively folded and faulted, great overthrusts occurring which have greatly complicated the structure of the district. The higher upland surface of the Piedmont represents the old Schooley peneplain, while at lower levels have been developed the Weverton and Harrisburg peneplains, the last forming the floor of the Frederick Valley and some of the smaller streams which trench the Piedmont area.

Towson is situated for the most part on the crystalline Baltimore gneiss, the higher portions of the town reaching the ridge of Setter's quartzite, while to the north of this in the various valleys stretching to the north, west, and east may be found the so-called Cockeysville marble which has been so extensively worked for economic purposes. Towson lies on the surface of the ancient Schooley peneplain, this upland being more or less dissected by the streams which have cut their way through the overlying rock.

BELAIR is located on the broad upland plain of the Piedmont, known as Schooley peneplain, a large area of gabbro forming the underlying rock to the north and west, while the gneiss is the basal rock to the east. Some miles to the northward the Maryland and Pennsylvania Railroad runs through a small gorge capped by quartzite (Rocks of Deer Creek), while near the state line at Cardiff is the famous Peach Bottom slate district (Slate Ridge).

WESTMINSTER is near the center of the Piedmont area, and is situated on the broad plateau known as the Weverton peneplain, which in this district has not been deeply trenched by the stream channels. The most common rock of the region is the phyllite, intercalated with which are numerous lenses of crystalline limestone and basic volcanics, especially along the line of the railroad to the west of the city (Union Bridge). At several points in the center of the county are dikes of diabase rock.

ELLCOTT CITY nestles in the gorge of the Patapsco River in the midst of an area of gabbro cut at many points by dikes and larger bodies of granite, while farther west are numerous pegmatite dikes which have been the source of commercial feldspar.

ROCKVILLE is located in the schist district of the dissected central Piedmont. To the south is an area of basic volcanics, to the east are granites and diorites, and to the west dikes of serpentine and diabase. About Seneca and farther west is a large district composed of Newark breccia, sandstones, and shales (Triassic).

WESTERN MARYLAND

This region has been hitherto described under the name of the Appalachian Region and presents a great diversity in its physiography and geology. The rocks have been deformed into a series of folds, much faulted to the east, but generally becoming flatter to the west. The crests of the mountain tops represent the ancient Schooley peneplain, while the lower ridges and valleys successively represent the Weverton and Harrisburg peneplains, while along the Potomac and its larger estuaries terraces of later date may be observed. The rocks comprise the various Paleozoic formations from the Cambrian to the Permian, with here and there ancient igneous rocks, while along the eastern margin of the district are to be found the Triassic sandstones and shales. The Potomac has cut its way downward from the ancient peneplain over which it flowed across the numerous sandstone ridges of the district, while its tributary streams have for the most part made their channels in the softer rock.

HAGERSTOWN is situated on the broad valley floor of the Harrisburg peneplain, the underlying rocks being limestone of late Cambrian and early Ordovician age. A few miles to the west of the city extending from Williamsport to the northern border of the state is a low ridge of late Ordovician shale (Martinsburg). Along the mountain sides the Weverton peneplain is indistinctly shown, but in the level-topped crests of South (quartzite) and North (sandstone) mountains are remnants of the old Schooley peneplain. Fossil remains of the early Paleozoic formations

showing the marine character of most of these formations may be collected at times in the quarries and railroad cuts.

CUMBERLAND is located in the Potomac Valley and its tributary Braddock Run and is largely underlain by Silurian (Clinton) shale, often rich in fossils, showing the marine origin of the deposits. Cumberland is bounded on the west by Wills Mountain (Juniata and Tuscarora sandstones), which in its level-topped crest line shows with exceptional clearness the ancient level of the Schooley peneplain that once extended over the entire region before the valleys were cut in the softer beds. To the west as well as to the east of Wills Mountain, which represents the axis of a great fold, come in succession the various Silurian, Devonian, and Carboniferous formations. On the western limb of this fold in beds of Silurian age occurs the Devils Backbone. These various formations are often rich either in marine fossils or terrestrial plant remains, and Cumberland has long been classic ground for the geologist. The deep valley gradually cut by Braddock Run through the Wills Mountain anticline is of unusual geologic interest, while the numerous terraces in and adjacent to the city are among the best in the valley of the Potomac.

OAKLAND is located in the valley of the Youghiogheny River, the waters of which reach the Ohio River. It is situated on the Devonian shales (Jennings), which stretch as a broad belt from northeast to southwest across the county. East and west of Oakland the sandstone ridges constitute remnants of the ancient Schooley peneplain which in Garrett County must have stood at quite 3500 feet in elevation. Both in the Potomac basin to the southeast and the Oakland basin to the west, the Carboniferous deposits afford many localities from which both animal and plant remains may be secured. Oakland itself stands near the center of a great fold which is more flattened here than in the more eastern parts of the Appalachian district.

SOUTHERN MARYLAND

This area is embraced within the limits of the Coastal Plain and is composed of various geological formations from the Lower Cretaceous to the Pleistocene. The deposits are made up chiefly of gravels, sands,

clays, and marls, which are in the main unconsolidated and dip at a very low angle to the southeast. The district has been subjected to a series of elevations and depressions since late Tertiary time, with the result that a complicated series of terraces has been developed along the margin of the Coastal Plain and in its various river channels. These later Tertiary and Pleistocene terraces succeed one another from above downward, the sea at the present day being engaged in the formation of the last of the series beneath the shallow marginal waters. The streams are largely tidal, the channels being submerged at the time the waters of the Atlantic filled the basin of the Chesapeake during the last great depression of the late Pleistocene epoch.

ANNAPOLIS is located on the Talbot terrace (late Pleistocene), the escarpment of the Wicomico terrace (middle Pleistocene) being found near the western margin of the city. On the Severn River nearby the Eocene strata occur beneath the Talbot, containing at many points characteristic marine fossils (mollusks, sharks' teeth, etc.), while farther up the stream occur beds of Upper Cretaceous age, also fossiliferous, dipping beneath the Eocene. The uppermost of these (Monmouth and Matawan) contain marine fossils, while the subjacent formations (above Round Bay), consisting of white sands and clays (Magothy and Raritan), contain at times terrestrial plant remains. To the south of Annapolis about South and West rivers occur the Miocene formations overlying the Eocene, the diatomaceous deposits of the latter being especially well represented around Herring Bay.

UPPER MARLBORO is situated on a tributary of the Patuxent River on the dissected upland surface of the Coastal Plain, the Eocene formations extensively outcropping in the surrounding region. Numerous marine fossils of Eocene age have been found in the greensand beds. In the valleys of Western Branch and the nearby Patuxent, the Talbot terrace is in places well developed, while at higher points remnants of both the Wicomico and Sunderland terrace are also found. Some miles to the south of Upper Marlboro the Brandywine terrace is typically developed, the broad plain in this region being the most extensive on the western side of the Chesapeake.

LA PLATA is situated near the southern end of the Brandywine terrace, although the plain is here much dissected, the lower terraces occurring not far away in the various stream channels. The underlying deposits are of Eocene age, generally greensand marls, frequently rich in fossil remains.

PRINCE FREDERICK is situated on the Sunderland terrace, which forms the crest of the highland between Chesapeake Bay and Patuxent River. To the east and west of the town the stream channels cut through to the underlying Miocene deposits which in Calvert County have furnished a great wealth of fossil remains, all of the Miocene formations being here well developed. The Wicomico and Talbot terraces appear one below the other at various points along the margin of the Chesapeake and Patuxent.

LEONARDTOWN is likewise situated on the Sunderland terrace with successively lower terraces appearing both along the Potomac and Patuxent river fronts and frequently extending up the tributary channels. Beneath these terraces, over a large part of St. Mary's County, are found the several Miocene formations, rich in marine fossils, and extensive collections both from this and adjacent counties now enrich the museums both of this and foreign countries.

NORTHERN EASTERN SHORE

The northern Eastern Shore is chiefly confined to the Coastal Plain, the deposits in general being similar to those found in Southern Maryland. They consist of representatives of the various formations from the Lower Cretaceous to the Pleistocene. The several terraces described for Southern Maryland are here developed, although the Brandywine and Sunderland terraces are much less extensively represented in this area. On the other hand, the Wicomico and Talbot terraces are much more largely developed and present broad terraced plains that are highly characteristic of the northern district, the escarpment separating the Talbot from the Wicomico terrace being one of the most distinctive physiographic features in the region. Tidal rivers extend far into the region, even the upper courses of the streams being for the most part sluggish because of the relatively slight elevation of the land.

ELKTON is situated at the head of Elk River on the Talbot terrace, which is underlain at this point by Potomac clays (Lower Cretaceous). Surrounding the town on the north, east, and west are the higher and older terrace formations (Wicomico and Sunderland). Farther to the northward is an extensive area of granite-gneiss overlain along the eastern margin by Cretaceous sediments. The very characteristic hypersthene gabbro outcrops at Grays Hill and along the valley of Big Elk Creek. Farther to the north and west in Cecil County occur serpentine and other eruptive rocks, while to the south along Elk Neck and in southern Cecil County may be found an extensive series of Upper Cretaceous and Tertiary formations, many of them rich in marine organic remains.

CHESTERTOWN is located on the Talbot terrace in the valley of Chester River, although the escarpment of the Wicomico terrace is found on the northern margin of the town. This older terrace covers an extensive area in central and eastern Kent County. Eocene deposits, either unaltered greensands or oxidized reddish sands, are found beneath the terrace cover.

CENTERVILLE likewise lies near the margin between the Talbot and Wicomico terraces, the latter covering an extensive area to the south and east of the town. Beneath these surface formations both at Centerville and throughout most of Queen Anne's County occur Miocene formations, which at a few points have furnished marine organic remains.

EASTON is likewise situated near the margin between the lower Talbot terrace and the next higher Wicomico terrace, the latter covering an extensive area in central and northern Talbot County. Beneath these formations the Miocene marine beds are found, as is the case farther north.

DENTON is situated in the valley of the Choptank River along the basin of which the Talbot terrace extends from Chesapeake Bay as far as Greenville. To the east and south of Denton the higher Wicomico terrace spreads out as a broad plain throughout the central, southern, and eastern portions of the county. Beneath this surface formation Miocene strata are found with their marine fossils.

SOUTHERN EASTERN SHORE

This division of the state is wholly within the area of the Coastal Plain and presents many features in common with the southern part of the district just described. It is very low, rising only at a few points to 80 feet in height above tide, this elevation being reached in the remnants of the Wicomico terrace, which extends southward only at a few points into the southern Eastern Shore. Most of the district is covered by the Talbot terrace, which around its landward margin does not exceed 40 feet in elevation, although a large part of the area in the southern counties is below 25 feet in elevation above tide. The underlying formation of Miocene age only outcrops at a few points in the northern part of the district, although deep-well borings have penetrated these and still older formations. Marsh lands cover extensive areas in Dorchester, Wicomico, and Somerset counties, while the Atlantic border of Worcester County has a splendidly developed ocean sand bar nearly inclosing a large area of brackish water known as Chincoteague Bay.

CAMBRIDGE is located on the Talbot terrace, which spreads as a level-topped plain of many hundred square miles in area in all directions, reaching far into the confines of adjacent counties. The Wicomico terrace appears some miles to the eastward at East Newmarket, but covers only a small area in eastern Dorchester County. Underlying the deposits of these terraces are the later formations of the Miocene, which outcrop at a few points near Cambridge and farther up the Choptank River where characteristic marine fossils have been found.

SALISBURY is situated on the Wicomico River on the Talbot terrace, although the Wicomico terrace appears not far to the north and east, but from its seaward slope it is much lower here than in the counties farther northward and the escarpment separating the two terraces is less sharply defined. No deposits of older date are found along the stream channels, although well borings have penetrated the underlying Miocene formations.

PRINCESS ANNE is located on the Talbot terrace but a few feet above tide level, the terrace here being broad and level and reaching well to the northern limits of the county, where at one point in the northeastern

corner the Wicomico terrace projects itself for a short distance beyond the boundary. No underlying deposits are found along the stream channels, although they have been penetrated in well borings, especially at Crisfield, where a well boring over 1000 feet in depth has not only penetrated the Miocene deposits but also the Eocene and Cretaceous as well. although it has not touched bed rock.

SNOW HILL is likewise found on the Talbot terrace very near tide level, the terrace plain here likewise stretching in all directions for many miles. The Wicomico terrace is only found in a few detached areas near the north and northwest borders of the county. The Talbot terrace contains along its seaward margin various later deposits of wind-blown sand that at times reach the proportions of important dunes, while the bars and spits along the coast possess much of recent geologic interest. No underlying deposits are found, although deep-well borings in adjacent areas show that these formations exist at depths beneath the surface cover of terrace formations.

TABLE I.—GOVERNORS OF MARYLAND

BARONS OF BALTIMORE AND LORDS PROPRIETARY OF MARYLAND

GEORGE CALVERT, FIRST LORD BALTIMORE

LORDS PROPRIETARY

Cecil Calvert, Second Lord Baltimore.....	1632-1675
Charles Calvert, Third Lord Baltimore.....	1675-1715
Benedict Leonard Calvert, Fourth Lord Baltimore.....	1715
Charles Calvert, Fifth Lord Baltimore.....	1715-1751
Frederick Calvert, Sixth Lord Baltimore.....	1751-1771
Sir Henry Harford.....	1771-1776

PROVINCIAL GOVERNORS

Leonard Calvert	1633-1645
Richard Ingle (usurper).....	1645
Edward Hill (chosen by the council).....	1646
Leonard Calvert	1646-1647
Thomas Greene	1647-1649
William Stone	1649-1652
Richard Bennett } Edmund Curtis } William Claiborne }	(Commissioners of Parliament).....1652

William Stone	1652-1654
William Fuller and others (appointed by Commissioners of Parliament)	1654-1658
Josias Fendall	1658-1660
Philip Calvert	1660-1661
Charles Calvert	1661-1675
Charles Calvert, third Lord Baltimore.....	1675-1676
Cecilius Calvert (titular) and Jesse Wharton (real).....	1676
Thomas Notley	1676-1679
Charles Calvert, third Lord Baltimore.....	1679-1684
Benedict Leonard Calvert (titular) and council (real).....	1684-1688
William Joseph (president of the council).....	1688-1689
Protestant Association under John Goode.....	1689-1692

ROYAL GOVERNORS

Sir Lionel Copley.....	1692-1693
Sir Edmond Andros.....	1693-1694
Francis Nicholson	1694-1699
Nathaniel Blackistone	1699-1702
Thomas Tench (president of the council).....	1702-1704
John Seymour	1704-1709
Edward Lloyd (president of the council).....	1709-1714
John Hart	1714-1715

PROPRIETARY GOVERNORS

John Hart	1715-1720
Charles Calvert	1720-1727
Benedict Leonard Calvert.....	1727-1731
Samuel Ogle	1731-1732
Charles Calvert, fifth Lord Baltimore.....	1732-1733
Samuel Ogle	1733-1742
Thomas Bladen	1742-1747
Samuel Ogle	1747-1752
Benjamin Tasker (president of the council).....	1752-1763
Horatio Sharpe	1753-1769
Robert Eden	1769-1774

REVOLUTIONARY GOVERNORS

Robert Eden (nominal) and Convention and Council of Safety (real).....	1774-1776
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STATE GOVERNORS

Thomas Johnson	1777-1779
Thomas Sim Lee.....	1779-1782
William Paca	1782-1785
William Smallwood	1785-1788
John Eager Howard.....	1788-1791
George Plater (died in office).....	1791-1792
James Brice (acting).....	1792

Thomas Sim Lee.....	1792-1794
John H. Stone.....	1794-1797
John Henry, Democratic Republican.....	1797-1798
Benjamin Ogle, Federalist.....	1798-1801
John Francis Mercer, Democratic Republican.....	1801-1803
Robert Bowie, Democratic Republican.....	1803-1806
Robert Wright, Democratic Republican (resigned May 6, 1808).....	1806-1808
James Butcher (acting).....	1808-1809
Edward Lloyd, Whig.....	1809-1811
Robert Bowie, Democratic Republican.....	1811-1812
Levin Winder, Federalist.....	1812-1815
Charles Ridgely, Federalist.....	1815-1818
Charles Goldsborough, Federalist.....	1818-1819
Samuel Sprigg, Democratic Republican.....	1819-1822
Samuel Stevens, Jr., Democratic Republican.....	1822-1825
Joseph Kent, Democratic Republican.....	1825-1828
Daniel Martin, Anti-Jackson.....	1828-1829
Thomas King Carroll, Jackson Democrat.....	1829-1830
Daniel Martin, Anti-Jackson.....	1830-1831
George Howard (acting), Whig.....	1831-1832
George Howard, Whig.....	1832-1833
James Thomas, Whig.....	1833-1835
Thomas W. Veazey, Whig.....	1835-1838
William Grason, Democrat.....	1838-1841
Francis Thomas, Democrat.....	1841-1844
Thomas G. Pratt, Whig.....	1844-1847
Philip Francis Thomas, Democrat.....	1847-1850
Enoch Louis Lowe, Democrat.....	1850-1853
Thomas Watkins Ligon, Democrat.....	1853-1857
Thomas Holliday Hicks, American or Know-Nothing.....	1857-1861
Augustus W. Bradford, Unionist.....	1861-1865
Thomas Swann, Unionist.....	1865-1868
Oden Bowie, Democrat.....	1868-1872
William Pinkney Whyte, Democrat (resigned in 1874 to become, March 4, 1875, U. S. Senator from Maryland).....	1872-1874
James Black Groome, Democrat.....	1874-1876
John Lee Carroll, Democrat.....	1876-1880
William T. Hamilton, Democrat.....	1880-1884
Robert M. McLane, Democrat.....	1884-1885
Henry Lloyd, Democrat.....	1885-1888
Elihu E. Jackson, Democrat.....	1888-1892
Frank Brown, Democrat.....	1892-1896
Lloyd Lowndes, Republican.....	1896-1900
John Walter Smith, Democrat.....	1900-1904
Edwin Warfield, Democrat.....	1904-1908
Austin L. Crothers, Democrat.....	1908-1912
Phillips Lee Goldsborough, Republican.....	1912-1916
Emerson C. Harrington, Democrat.....	1916-

TABLE II.—THE POPULATION AND AREA OF THE STATE BY COUNTIES

Counties	Date of erection	1910	Area in square miles	County towns
Allegany	1789	62,411	440.5	Cumberland.
Anne Arundel	1650	39,553	430.4	Annapolis.
Baltimore	1659	122,349	646.8	Towson.
Baltimore City	1729	558,485	30.0	.....
	1851			
Calvert	1654	10,325	216.8	Prince Frederick.
Caroline	1726	19,216	317.4	Denton.
Carroll	1838	33,934	445.3	Westminster.
Cecil	1674	23,759	374.6	Elkton.
Charles	1660	16,386	462.0	La Plata.
Dorchester	1666	28,669	573.2	Cambridge.
Frederick	1748	52,673	660.0	Frederick.
Garrett	1872	20,105	681.0	Oakland.
Harford	1773	27,965	439.8	Belair.
Howard	1850	16,106	249.1	Ellicott City.
Kent	1637	16,957	281.0	Chestertown.
Montgomery	1776	32,089	517.6	Rockville.
Prince George's	1695	36,147	479.6	Upper Marlboro.
Queen Anne's	1706	16,839	363.4	Centerville.
St. Mary's	1637	17,030	369.1	Leonardtown.
Somerset	1668	26,455	328.6	Princess Anne.
Talbot	1661	19,620	267.1	Easton.
Washington	1776	49,617	457.3	Hagerstown.
Wicomico	1867	26,815	368.9	Salisbury.
Worcester	1742	21,841	491.5	Snow Hill.

TABLE III.—POPULATION OF PRINCIPAL CITIES AND TOWNS OF MARYLAND—CENSUS 1910

Annapolis	8,609	Havre de Grace.....	4,212
Baltimore	558,485	Hyattsville	1,917
Belair	1,005	Laurel	2,415
Berlin	1,317	Lonaconing	1,553
Brunswick	3,721	Midland	1,173
Cambridge	6,407	Mount Rainier	1,242
Centerville	1,437	Oakland	1,366
Chesapeake City	1,016	Oxford	1,191
Chestertown	2,735	Pocomoke City	2,369
Crisfield	3,468	Port Deposit	1,394
Cumberland	21,839	Princess Anne	1,006
Denton	1,481	Rockville	1,181
Easton	3,083	St. Michaels	1,517
Elkton	2,487	Salisbury	6,690
Ellicott City	1,151	Snow Hill	1,844
Emmitsburg	1,054	Takoma Park	1,242
Federalsburg	1,050	Westernport	2,702
Frederick	10,411	Westminster	3,295
Frostburg	6,028	Williamsport	1,571
Hagerstown	16,507		

TABLE IV.—LEGAL HOLIDAYS IN MARYLAND

1. New Year's Day, January 1.
2. Washington's Birthday, February 22.
3. Decoration Day, May 30.
4. Independence Day, July 4.
5. Defenders' Day, September 12.
6. Columbus Day, October 12.
7. Christmas Day, December 25.
8. Good Friday.
9. General Election Day.
10. Congressional Election Day.
11. All special days that may be appointed or recommended by the Governor of this State or the President of the United States as the days of thanksgiving, fasting and prayer or other religious observance, or for the general cessation of business.
12. Sundays.

Saturday afternoon is a holiday in Annapolis, Baltimore city and county, in the counties of Harford, Montgomery and Cecil, and in the towns of Ellicott City and Westminster.

Labor Day (the first Monday in September) is a Federal holiday by Act of Congress and is generally proclaimed by the Governor a legal holiday in Maryland.

Arbor Day is designated by the Governor as a day for tree planting.

Repudiation Day, November 23, is a legal half holiday in Frederick County.

Whenever the first of January, the twenty-second of February, the fourth of July, or twenty-fifth of December shall occur on Sunday, the Monday next following shall be a public holiday, provided that in such case all bills of exchange, bank checks, drafts and promissory notes which would otherwise be presentable shall be deemed to be presentable for acceptance or for payment on the Saturday next preceding such holiday.

TABLE V.—MINERAL PRODUCTS IN MARYLAND, 1916

Coal and Coke.....	\$8,334,632
Clay Products:	
Brick and Tile, including Sand-Lime Brick.....	\$1,548,295
Pottery	277,575
Clay mined	82,667
	1,908,537
Stone Products:	
Granite and Trap.....	\$633,218
Sandstone	6,003
Marble	59,506
Limestone	223,182
Slate	71,737
	993,636
Lime and Cement.....	2,332,846
Sand and Gravel.....	900,061
Mineral Waters	99,020
Feldspar	83,951
Quartz	18,284
Iron Ore and Mineral Paint.....	32,540
Talc, Soapstone, Infusorial Earth.....	3,000
	\$13,469,702

TABLE VI.—MARYLAND FARM STATISTICS—U. S. CENSUS 1910

Population of state.....	1,295,346
Rural population	637,154
Approximate land area of the state, acres.....	6,362,240
Land in farms, acres.....	5,057,140
Improved land in farms, acres.....	3,354,767
Number of all farms.....	48,923
Average acres per farm.....	301.4
Value of farm property.....	\$286,167,028
Average value of all property per farm.....	\$5,849
Average value of land per acre.....	\$32.32

TABLE VII.—VALUE OF MARYLAND CROPS—U. S. CENSUS 1910

FARM CROPS	
Corn	\$11,015,298
Wheat	9,876,480
Hay and forage.....	6,011,749
Vegetables other than potatoes.....	5,729,400
Forest production of farms.....	2,349,045
Potatoes and sweet potatoes and yams.....	2,266,705
Fruits and nuts.....	1,577,987
Tobacco	1,457,112
Small fruits	1,227,548
Flowers, plants and nursery products.....	1,053,901
Oats	584,395
Rye	252,691
Buckwheat	99,216
Barley	79,231
All other grains and seeds.....	97,523
All other products.....	241,877
Total	\$43,920,149

TABLE VIII.—VALUE OF MARYLAND LIVE STOCK PRODUCTS
U. S. CENSUS 1910

Domestic animals sold and slaughtered.....	\$8,496,767
Milk, cream and butter fat sold and butter and cheese made.....	5,480,900
Eggs, partly estimated.....	3,235,759
Poultry raised, partly estimated.....	3,011,382
Wool, partly estimated.....	199,909
Honey	38,164
Wax	1,080

TABLE IX.—LUMBER AND TIMBER CUT BY COUNTIES
FOR THE YEAR 1914

ACCORDING TO THE STATE BOARD OF FORESTRY

County	Mills	Cut—Cubic feet	Value
Allegany	45	3,016,400	\$433,284
Anne Arundel	22	1,099,610	130,099
Baltimore	30	2,119,584	308,186
Calvert	20	1,448,475	202,597
Caroline	61	1,654,340	220,054
Carroll	25	991,960	118,850
Cecil	24	716,780	96,893
Charles	30	5,838,080	485,426
Dorchester	37	2,231,160	352,405
Frederick	51	809,965	179,004
Garrett	62	7,750,245	1,379,937
Harford	27	774,555	118,342
Howard	12	599,455	64,696
Kent	10	382,870	53,047
Montgomery	28	1,215,545	175,422
Prince George's	32	1,388,000	161,939
Queen Anne's	26	690,205	80,963
St. Mary's	33	1,226,755	157,002
Somerset	46	2,742,423	363,174
Talbot	38	1,274,994	135,012
Washington	26	1,460,950	189,350
Wicomico	64	3,949,470	592,318
Worcester	51	3,525,700	496,191
The state	800	46,907,521	\$6,494,191

TABLE X.—MARYLAND MANUFACTURES FOR THE YEAR 1910
ACCORDING TO U. S. CENSUS

Product.	No. of establish- ments.	Capital invested.	No. of persons in industry.	Salaries and wages paid.	Cost of materials.	Value of product.
Clothing, men's, including shirts.....	359	\$19,578,000	21,946	\$9,364,000	\$20,966,000	\$36,921,000
Copper, tin and sheet iron products.....	81	24,719,000	5,980	2,893,000	10,508,000	16,909,000
Canning and preserving.....	468	8,377,000	9,755	2,277,000	10,009,000	13,709,000
Slaughtering and meat packing.....	54	3,808,000	1,324	869,000	11,503,000	13,683,000
Lumbering and timber products.....	561	9,182,000	8,165	2,874,000	6,507,000	12,134,000
Foundry and machine shop products.....	157	10,324,000	5,520	3,469,000	5,956,000	11,978,000
Tobacco manufacture.....	263	6,644,000	4,098	1,604,000	5,666,000	10,559,000
Fertilizers.....	41	9,098,000	1,750	1,035,000	6,963,000	9,673,000
Flour-mill and grist-mill products.....	295	3,729,000	935	320,000	8,003,000	9,268,000
Cars and general shop construction and repairs by steam railroads.....	21	4,264,000	5,926	3,818,000	5,193,000	9,059,000
Printing and publishing.....	371	6,675,000	4,942	3,229,000	2,464,000	8,360,000
Bread and other bakery products.....	516	3,214,000	2,820	1,095,000	4,363,000	6,868,000
Liquors, malt.....	20	8,834,000	1,095	1,080,000	1,569,000	5,690,000
Patent medicines and compounds and druggists' preparations.....	83	4,114,000	1,846	1,178,000	2,167,000	5,548,000
Cotton goods, including cotton smallwares	16	9,024,000	4,077	1,291,000	4,012,000	5,522,000
Liquors, distilled.....	25	4,863,000	387	357,000	1,149,000	5,362,000
Confectionery.....	54	2,753,000	1,888	748,000	3,162,000	5,082,000
Paper and wood pulp.....	13	8,399,000	1,349	779,000	3,278,000	4,894,000
Clothing, women's.....	72	1,694,000	3,030	1,159,000	2,285,000	4,351,000
Ship building, including boat building...	46	4,413,000	1,968	2,258,000	1,849,000	3,535,000
Furniture and refrigerators.....	48	2,507,000	2,133	1,034,000	1,601,000	3,350,000
Hats, straw.....	7	2,607,000	1,808	984,000	1,783,000	3,347,000
Gas, illuminating and heating.....	18	26,954,000	817	487,000	629,000	3,223,000
Leather, tanned, curried, and finished....	13	2,208,000	523	291,000	2,114,000	2,661,000
Marble and stone work.....	89	2,164,000	1,658	991,000	957,000	2,427,000
Umbrellas and canes.....	9	827,000	640	312,000	1,076,000	1,650,000
Musical instruments, pianos and organs and materials.....	7	2,301,000	833	526,000	566,000	1,466,000
Boots and shoes, including cut stock and findings.....	14	678,000	670	303,000	912,000	1,431,000
Carriages, wagons, and materials.....	126	1,192,000	960	417,000	541,000	1,330,000
Belting and hose, woven and rubber.....	4	826,000	315	136,000	995,000	1,318,000
Chemicals.....	3	1,676,000	316	195,000	684,000	1,313,000
Hosiery and knit goods.....	11	930,000	1,062	263,000	697,000	1,172,000
Leather goods.....	43	682,000	433	105,000	607,000	1,043,000
Glass.....	7	887,000	1,105	569,000	237,000	1,038,000
Ice, manufactured.....	42	2,552,000	466	313,000	300,000	1,022,000
Paint and varnish.....	12	503,000	190	90,000	700,000	1,001,000
Brick and tile.....	40	5,117,000	1,331	540,000	249,500	971,000
Boxes, fancy and paper.....	17	733,000	770	214,000	395,000	853,000
Baking powders and yeast.....	7	251,000	201	96,000	489,000	840,000
Pottery, terra cotta, and fire clay products	16	973,000	799	387,000	206,000	757,000
Brass and bronze products.....	17	346,000	267	159,000	432,000	748,000
Mattresses and spring beds.....	19	373,000	252	115,000	469,000	729,000
Stoves and furnaces, including gas and oil stoves.....	8	754,000	471	289,000	205,000	676,000
Butter, cheese and condensed milk.....	44	257,000	137	49,000	524,000	654,000
Cooperage and wooden goods not else- where specified.....	40	428,000	384	155,000	358,000	617,000
Silk and silk goods, including throwsters.	4	488,000	681	192,000	237,000	512,000
Baskets, and rattan and willow ware.....	25	317,000	586	339,000	227,000	471,000
Lime.....	43	833,000	473	148,000	132,000	420,000
Millinery and lace goods.....	14	213,000	300	100,000	172,000	389,000
Silverware and plated ware.....	10	322,000	215	136,000	115,000	355,000
Jewelry.....	15	202,000	121	66,000	132,000	257,000
Hats and caps, other than felt, straw and wool.....	17	69,000	155	70,000	90,000	208,000
Boxes, cigar.....	9	117,000	183	56,000	116,000	194,000
All other industries.....	523	36,234,000	15,427	8,252,000	62,155,000	78,121,000
State.....	4,837	\$251,227,000	125,489	\$59,053,000	\$199,049,000	\$315,669,000

TABLE XI.—ALTITUDES IN MARYLAND

ELEVATIONS OF POINTS IN MARYLAND, GROUPED BY COUNTIES

ALLEGANY COUNTY			
Localities	Elevation in feet	Localities	Elevation in feet
Cumberland	626	Parkton	420
Dan's Rock	2882	Cockeysville	279
Frostburg	1929	Lake Roland	360
Mt. Savage	1198	Loch Raven	180
Westernport	1000	Relay Viaduct	71
Piney Grove	937	Bradshaw	40
Flintstone	828	North Point	10
Oldtown	564		
ANNE ARUNDEL COUNTY		CALVERT COUNTY	
Annapolis	40	Prince Frederick	150
Marriott Hill	240	Mt. Harmony	150
Davidsonville	185	Port Republic	160
Owensville	182	Bowens	160
Odenton	160	Parran	136
Jewell	160	Chesapeake Beach	15
Friendship	150	Lower Marlboro	20
Glenburnie	56		
BALTIMORE CITY		CAROLINE COUNTY	
City Hall	25	Denton	40
High Service Reservoir.....	350	Marydel	64
Druid Hill Park (Mansion House)	320	Federalsburg	10
J. H. U. (Carroll Mansion) ...	245	Greensboro	40
Mt. Royal Reservoir.....	155		
Hotel Altamont (street).....	270	CARROLL COUNTY	
Patterson Park Observatory...	125	Springfield Hospital	560
Johns Hopkins Hospital.....	105	Westminster	774
Washington Monument (base)	100	Manchester	980
Carroll Park (Mansion House)	95	Hampstead	913
Fort McHenry	30	Bachmans Mills	631
		Sykesville	383
		Finksburg	565
		Taneytown	493
		Parr's Ridge near Manchester.	1100
BALTIMORE COUNTY		CECIL COUNTY	
Towson (Courthouse)	465	Elkton	29
Reisterstown	735	Rock Spring	510
St. Thomas' Church.....	650	Woodlawn	465
Pikesville	516	Calvert	441
Catonsville	500	Rising Sun	387
Chattolane	410	Gray's Hill	268
Long Green	300	Cecilton	85
Fork	420	Port Deposit	16
		Chesapeake City	17

CHARLES COUNTY

Localities	Elevation in feet
La Plata	190
Hughesville	193
Patuxent	184
Chapel Point	160
Indian Head	40
Port Tobacco	25
Popes Creek	8

DORCHESTER COUNTY

Cambridge	20
Vienna	12
Church Creek	5
Drawbridge	3
Hurlock	50
Golden Hill	2
East Newmarket	43

FREDERICK COUNTY

Frederick	296
Sugar Loaf Mountain.....	1281
Thurmont	519
Monocacy Bridge	198
Point of Rocks.....	230

GARRETT COUNTY

Oakland	2461
Backbone Mountain (highest point in Maryland).....	3340
Table Rock	3100
Altamont	2632
Accident	2395
Deer Park	2447
Mountain Lake Park.....	2405
Grantsville	2351
Friendsville	1501
Bloomington	1037

HARFORD COUNTY

Eelair	396
Madonna	748
Darlington	324
Aberdeen	79
Perryman	50
Havre de Grace.....	35

HOWARD COUNTY

Localities	Elevation in feet
Ellicott City (Courthouse)....	233
Clarksville	484
West Friendship	476
Marriottsville	295
Woodstock	276
Savage	200
Poplar Springs	729

KENT COUNTY

Chestertown	22
Blacks	70
Stillpond	78
Massey	64
Sassafras	34
Millington	27
Edesville	24
Georgetown	50

MONTGOMERY COUNTY

Rockville	450
Clarksburg	700
Gaithersburg	512
Dickerson	363
Cabin John Bridge.....	120

PRINCE GEORGE'S COUNTY

Upper Marlboro	39
Brandywine	233
Accokeek	210
Aquasco	158
Laurel	154
Bowie	149
Fort Washington	100
Beltsville	110
Hyattsville	46
Queen Anne	30

QUEEN ANNE'S COUNTY

Centerville.....	59
Sudlersville	67
Church Hill	35
Queen Anne	30
Kent Island Landing.....	5
Crumpton	22
Queenstown	10

SOMERSET COUNTY

Localities	Elevation in feet
Princess Anne	18
Eden	20
Wellington	27
Costen	21
Peninsula Junction	42
Kingston	8

Localities

Localities	Elevation in feet
Pittsville	55
Delmar	57
Whitehaven	5
Mardela Springs	27
Sharptown	10
Quantico	20
Allen	10

ST. MARY'S COUNTY

Leonardtwn	100
Newmarket	172
Mechanicsville	165
Jarboesville	110
Park Hall	100
Morganza	71
Ridge	42
Valley Lee	50
Chaptico	20

WASHINGTON COUNTY

Hagerstown	552
Quirauk Mountain	2145
High Rock	1822
Blue Ridge Summit	1407
Blue Mountain House	1280
Fort Frederick	465
Hancock	448
Sharpsburg	425
Maryland Heights	1468
Sideling Hill	1635

TALBOT COUNTY

Easton	30
Wye Mills	22
Trappe	55
Oxford	11
St. Michaels	8

WORCESTER COUNTY

Snow Hill	21
Longridge	51
Berlin	45
Stockton	33
Girdletree	34
Whiteberg	30
Bishopville	23
Greenbackville	10
Pocomoke	8

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